US Army Corps of Engineers®

PROCEEDINGS OF THE MARINE TRANSPORTATION SYSTEM (MTS) RESEARCH AND TECHNOLOGY COORDINATION CONFERENCE

November 14-16, 2001

I. OPENING

WELCOME FROM CONFERENCE SPONSOR
Interagency Committee on the MTS

Rear Admiral Paul Pluta, U.S. Coast Guard

Good morning everyone -- you early risers. I appreciate your taking time out of your busy day to join us and keep the flame alive for the Marine Transportation System initiative.

As Chairman of this Interagency Committee on the Marine Transportation System (MTS), I would like to welcome you to the Sixth Biennial MTS Research and Technology Coordination Conference. The first R&T Coordination Conference, which focused exclusively on waterways management, was held in the early 1990's and was hosted by the U.S. Army Corps of Engineers, one of the many MTS partners. The U.S. Army Corps is again the conference host this year, with the focus now on the entire marine transportation system: waterways, ports, and their intermodal connectors.

Over the next three days, you will hear from many speakers and through breakout sessions, have the opportunity to discuss the research and technology needs of the MTS in the strategic action areas identified in the 1999 MTS Report to Congress: coordination, safety, competitiveness, infrastructure, environmental, and national security. Because national security is so important to all of us and in light of recent tragic events, maritime security will have a larger place in this year's conference.

The MTS initiative can be credited, at least in part, for the rapid response to these recent events; in particular, the MTS coordination structure. At the national level, working relationships with appropriate federal agencies were already in place through the Interagency Committee and within the private sector, through the MTS National Advisory Council. At the local level, Harbor Safety Committees have been very active and very helpful to our Coast Guard Captains of the Port and Group Commanders as they distribute their resources in response to the maritime security threats.

We are fortunate today to have with us today Admiral James Loy, Commandant of the United States Coast Guard to talk about maritime security. Admiral Loy has been a staunch supporter of the MTS Initiative since its inception. Before becoming the Commandant, he served as the Coast Guard's Chief of Staff, in the trenches devising strategy for the outreach program to garner support for the initiative. When he became Commandant in 1998, the MTS Initiative was one of his five imperatives. He participated in the MTS National Conference and has been the Keynote Speaker at many MTS functions since that time, including the 1999 MTS R&T Conference held here two years ago. Admiral Loy has focused his leadership on restoring Coast Guard readiness and shaping the future of our Coast Guard. One of the key elements of shaping our future is the MTS Initiative.

As a career seagoing officer, Admiral Loy knows the marine transportation system firsthand. He has served tours aboard six Coast Guard cutters, including command of a patrol boat in combat during the Vietnam War, and command of major cutters in both the Atlantic and Pacific Oceans. His seagoing experience and proven leadership uniquely qualify him to help define the new normalcy for maritime security, post-September 11. He has been, and will continue to work closely with Governor Ridge, the President's new Director of the Office of Homeland Security, and I'm sure as a result, the entire maritime community will benefit.

Please join me in giving a warm welcome to the Commandant of the Coast Guard, Admiral James Loy.

KEYNOTE ADDRESS
"The Unique Challenges of Maritime Security"

Admiral James M. Loy,
Commandant,
United States Coast Guard

Good morning everybody. As Paul said, it has been a pleasure for me to be part of this from the very beginning and to see it continuing. I think the two hundred or more people registered for this conference will help focus attention on the technological aspects and inferences of the MTS initiative.

When I look back on three and one-half years in this job so far, among those things that the U.S. Coast Guard and I as an organization can be proudest of, is the report that went to the Congress in September 1999. That report, a result of outreach to the maritime community throughout the country, as well as listening sessions and working groups, focused for the first time on the full spectrum of what we know about and need for our maritime transportation system. I want to thank all of you for hanging in there over these several years. It has been frustrating that since the report was sent to Congress, no one on the Hill has taken on the role of advocate to promote the entire package. I sometimes wonder whether we should have segmented the final product and sent it up in pieces, thereby providing an opportunity for subcommittees and committees to see a clear role for advocacy and sponsorship. That is not the approach we took, so today we are where we are. There is no doubt that the events of September 11 have caused the security piece to rise above all the other pieces of the MTS as the dimension of greatest concern to the nation at the moment.

My first obligation this morning is to note that over the course of the last seven weeks, as we have been attempting to methodically build a new maritime security game plan for the nation and for Governor Ridge and for the President, I have been especially proud to be part if this nation's larger maritime community. Whether it was on the day of September 11, when in New York Harbor folks came together—whether they were pilots, ferry boat operators, or USCG personnel—to serve the needs of an enormous number of people in Lower Manhattan. Whether it was Dick Bennis and his organizational efforts; whether it was individual sailors and seamen and merchant mariners from all parts of that harbor that morning, their willingness to shift gears and do what was necessary to assist the people in Manhattan was unbelievable. After losing its ability to do many of these things via landside transportation, we literally had to reestablish a transportation network around Lower Manhattan—it was accomplished by way of maritime people being willing to do what was necessary.

You probably heard some of the numbers—on a normal day in Manhattan, 186,000 people come and go to Manhattan from the water, primarily via ferry service, with the Staten Island Ferry carrying the largest share. On the morning of September 11, because of the combined efforts of the maritime community in the Port of New York and New Jersey, over one million people were evacuated from South Manhattan – an astonishing figure in and of itself, let

alone in the crisis atmosphere that existed that morning.

Since September 11, part of what we have been attempting to do is reestablish and itemize a clear set of goals that we think are important for the maritime security of our nation. It is one component of our search for whatever a new "normalcy" for port security is going to be. In doing so, we have honed in on four or five goals that I think are absolutely and enormously important. I will review those quickly before giving my prepared remarks on research and technology.

The first goal was to find a way to re-instill confidence in the American people that the maritime sector of their world was okay, that there was a comfort zone that could be established wherein those folks could feel secure about the maritime sector. In a sense, we were fortunate that on the 11th of September the bad guys chose a different means and venue than the maritime sector. There were a variety of different ways to render harm on this nation through the maritime sector, which I believe is perhaps both the most valuable and the most vulnerable. We need to find ways to deal with both of those notions to balance what is going to happen with respect to maritime security, together with the facilitation of commerce that is so vital to our nation's prosperity.

Secondly, we were very concerned about controlling the movement of vessels in all the ports, harbors, and waterways of the United States. We were and remain very concerned about establishing a greater presence there, both for the value it represents in deterrence, and the value it represents in response capabilities should any kind of an eventuality transpire. We were very concerned about inventorying the critical infrastructure within those ports and waterways and finding a way to prioritize that list. We need to be able to quickly acknowledge which pieces of that critical infrastructure are part of a federal system of guaranteeing security, and which are more appropriately dealt with by the lessees, owners or operators of the facilities involved. There is an infinite inventory, as you might imagine, from nuclear power plants, the Statue of Liberty and bridges, and container facilities and LNG terminals, and everything else across that spectrum.

Third, the Coast Guard, as an organization, fell back on our search and rescue instincts. We surged everything we had to the task and have been since backing away and finding what that new normalcy is, that new security profile that will require contributions not only from us but from many others as well. We have to identify the delta between what our 10th of September posture was and what the new normalcy will be – translate that into budgetary and resource requests to fit in the supplemental 2002 and 2003 budget as it goes by. The game plan is relatively straightforward and, as is always the case, the proof is in the details and so is the devil. That's what we have been working very hard on for Governor Ridge in the course of these last six or seven weeks.

The last element of that product required an enormous amount of outreach. I would imagine almost everyone in this room has attended, over the course of the last several weeks, one or more of the many meetings that Paul Pluta has called

to reach out to our maritime partners and help us all learn from each other, but understand fundamentally that at the end of the day, we all have a greater number of contributions to make to this higher security profile in our country. That is, in fact, the fundamental important piece to understand. There is no way that the Coast Guard will ever get all of the resources and assets necessary to be 100 percent secure in the ports and waterways of America. That is just never going to happen. Our challenge is to be, as called for in the MTS report, the collaborative leader in pulling people to the table and helping everyone collectively understand the network of contributions that must be made to that new higher security profile for our nation's ports and waterways. The outreach effort has been undertaken by Paul, at my direction, to reach into the maritime community as completely as we can and find the contributions appropriate to the task.

I'm delighted to be with you today also to discuss the technology. I think it is important for us to keep our nose to the grindstone as it relates to the overall MTS initiative. While security has found its way to the front burner for the moment, we cannot afford to set aside or to neglect any of the other elements Paul mentioned. Remember, if you will, that as our MTS report went forward, it fell into logical categories. It talked about coordination, safety, competitiveness, infrastructure, environmental and national security issues – those five or six categories became the collection points around which most of our data gathering and information gathering efforts actually focused when it was time to send the report to the Congress.

The challenge of security is arguably just one of the many concerns in the interest of a healthy and robust maritime transportation system and it is perhaps more important and more focused today as a result of 11th of September. There is no doubt that the recent attacks, the continuing threat, the fear of the unknown, and the simple notion that we don't know what we don't know, will keep the maritime security piece closer to the front burner than it ever has been before. It is therefore appropriate that we focus efforts on how technology can be used to meet the unique maritime security challenges confronting us today and into the future, while at the same time recognizing that all the other things -- efficiency and safety and environmental integrity -- are enormously important to our ports and waterways and must not be overlooked. Our ports will not be safe, efficient or clean unless they are sufficiently secure against this very amorphous and a bit unknown threat that continues to lurk around us.

The terror from the skies last month did not just kill thousands of innocent people and scar the skyline of New York City and Washington, D.C. It fundamentally changed our perception of security at home and around the world. No longer can the United States define security mainly as a projection of military might over there somewhere as part of an abroad notion of our national defense. The terrorists who aimed at our national symbols of economic and military strength struck with missiles made of the tools of our own prosperity. There is a message in there somewhere for all of us. We must remember that those four aircraft took off from Boston, Newark and Dulles – not from points overseas –

making it impossible to predict from where on the compass our next battle might come.

These tragic events clearly have forced us to reassess even our most basic definitions of national security and remake the means of achieving security for our nation's future. It has raised a burning question in everyone's mind about how do we prevent another attack. That question concerns us today and is a bit more specific – how do we meet the enormous challenge of providing maritime security against terrorism and other potential threats to the nation's maritime transportation system? In other words, we all have our fields of work, domains in which we work. Ours is on the water. Ours is the maritime world of the United States. How do we, those of us immersed in working in it and making our living in it, make a difference with respect to whether we can get ahead of the bad guy the next time?

Until recently, this notion of our national security being projected abroad rather than within our own borders has been very real. But following the recent attacks on our own cities, we now have a very good cause to be concerned about threats right under our own noses. This nation now faces the constant threat of terrorism as a means of coercion or retaliation just as much of the world has come to understand it routinely in the last 20-30-50 years. This is a situation that will likely continue for some time. As a nation that depends so heavily on oceans and sea-lanes as avenues of our prosperity, we know that whatever action we take in response must protect our ports and waterways and the ships that use them. They are just as important to our commerce with the world as airlines and trade centers, and clearly just as vulnerable. If you look at the statistics, as all of us did when we prepared our MTS report back in 1999, I would offer that the notion of value and vulnerability was very much in our minds all the way through that process. Almost $1.0 trillion worth of the United States' GDP is made up of contributions from the maritime sector -- $1.0 trillion. I have grown up living in the world of thousands and millions and we have found our way towards billions these days. But almost $1.0 trillion of the annual GDP of this nation is made up of contributions from the maritime sector. It is enormously valuable to our country and it is a fundamental building block to the prosperity that we have enjoyed for so many years.

The insidious nature of terror as a weapon is that even without being used, it can conjure all sorts of mayhem in the minds of its would-be victims. It is very different for us to be contemplating and trying to figure out how to go about guarding ourselves from whatever horrors the mind can imagine. It is almost easy to think in terms now of Cold War applications of a clear enemy with a clear notion that you can focus on and put all the great analytical minds to work to help us understand those things. The amorphous nature of the asymmetrics is perhaps its most challenging characteristic. Common to all the threats that we deal with on that asymmetric array is, in terms of a means of attack on the United States by either a state or a non-state actor who is either unwilling or unable to confront us directly, the notion of its potential maritime dimension. All of the maritime dimensions within those threats bring the

problem of national security for those of us who work in the maritime domain, much closer to home.

Looking at the multitude and the complexity of the threats and challenges we now face, it is almost like preparing to play a game of checkers against a familiar opponent, only to sit down and discover that you're already ten moves into a chess game, but it is a three-dimensional chess game against multiple opponents whose pieces are unconstrained by your previous understanding or whatever their rules of movement were. Such a game would be so unrecognizable that it would be hard for us to even figure out a name for it. That is true of this new era, in which we are responsible for the maritime piece of our total national security profile.

The President has responded to some of the complexities of these challenges by establishing a new cabinet-level position, the Directory of Homeland Security, whose job it is at the moment to coordinate the national effort to protect the homeland against terrorism. Whether or not he realizes it, the other transnational threats are part of that asymmetric array as well.

Much has been written on the issue of homeland security over the past few years. Much of it has been rather narrow in scope, focusing mainly on the notion of homeland defense as opposed to homeland security. That often took it to the Pentagon and left it there as a function of the military. But, this view is much too restrictive as these recent events have proven. The main exception to this rather narrow view was the Commission on National Security Strategy for the 21st Century, otherwise known as the Hart-Rudman Commission, which was published almost a year ago, back in January. Here is what the Hart-Rudman report said in a nutshell: "The United States will become increasingly vulnerable to hostile attack on the American homeland, and U.S. military superiority will not entirely protect us." And it concluded: "The security of the American homeland from the threats of the new century should be the primary national security mission of the U.S. government." It finally recommended: "The President should develop a comprehensive strategy to heighten America's ability to prevent and protect against all forms of attacks on the homeland, and to respond to such attacks if prevention and protection fail."

Well, the Commission was right. But, what might such a strategy look like, given that conventional uses of military, economic and diplomatic power – the normal three tools in the quiver of the U.S. arsenal -- would likely not be effective in countering some of those threats. My notion is that some additional capability needs to be married into those other three fundamental arrows in the quiver. I believe that extra arrow is one about civil authority blended with those other forms of state power.

Civil authority has usually been linked mainly with domestic security, rather than national security policy. However, as the Hart-Rudman Commission observed, the distinction between national security policy and domestic security is already beginning to blur, and in the next quarter century, it could disappear altogether. I think when viewed against transnational and

asymmetric threats, such blurring tends to make sense. For example, terrorism has consistently been defined as a criminal act and if terrorists are rooted out from among our own population, they will most likely be tried as criminals, notwithstanding what we saw in the paper this morning associated with the potential for military tribunals. The proper response to a criminal act within our own borders is to simply enforce the law. That is the nature of us as a people and as a country. Yet, we have found it necessary to now also use military means to destroy terrorist organizations that have global reach, and as the President suggests, even the nations who give them refuge.

Similarly, something as simple as inspecting cargo shipments for contraband is an expression first of civil authority, whether the contraband is computer technology, financial instruments, drugs or even weapons of mass destruction. However, that has not prohibited us from using Navy ships as platforms for Coast Guard boarding teams to interdict cocaine shipments headed for the United States, and then take them to the jurisdictional end of criminal prosecution.

We have to be very careful, however, that we do not blur our vision to the point that we lose the big picture. A correct response to these new threats must adhere to the principles of our Constitution and of our rule of law. We must continue to protect civil liberties of our own citizens while we protect their security. That interesting balance is something we have talked a lot about over the last several weeks.

Therefore, if our gut reaction to terrorism or any other threat would be to militarize our borders, we would, to a degree, undermine our own freedoms, and we would hand a victory to the terrorists. Though we can and should use the might of our military to meet these threats at our borders, it must always be used only as necessary to support and aid those who have the responsibility to enforce civil authority inside our country.

Threats to our security at home sadly remain and unfortunately, I think they will continue to grow in this new century. Separately and collectively, they pose dangers to our borders, our economy, our environment and our own safety. All of them have a distinct maritime dimension. They can be conveyed toward our shores in ways that can't always be countered by traditional naval forces. We can't really launch cruise missiles or air strikes at them as they approach. They draw near in civilian vessels that look like and mingle with legitimate commercial and even recreational traffic.

The biggest challenge currently facing our maritime transportation system is how to ensure that legitimate cargo is not unnecessarily delayed as we and other nations introduce some version of an enhanced security profile. Sustained prosperity clearly depends on our accommodating the global trade that is expected to double or triple over the next 20 years. Therefore, government needs to be attentive to finding ways to minimize the disruptions and delays caused by federal inspections and other requirements. Among the initial factors addressed by the Hart-Rudman Commission was that more stuff has to

move through borders faster, so they need to be loosened. The Commission then turned its attention to homeland security. Ensuring homeland security suggests a requirement to tighten those same borders we just suggested needed loosening. Government has an obligation to keep illegal immigrants, drugs, weapons, and other contraband from entering and leaving through those very same ports whose throughput we want to maximize in the interests of our national prosperity. To sustain prosperity, we open ports. To ensure security, we close ports. We clearly need to get beyond that metaphor of an opened or closed port and find a concept that permits both prosperity and security. Prosperity and security should not be competing interests when they serve the transcendent national interest.

Returning to our original question – how in the world do we protect our nation's maritime security in such a dynamic environment against such elusive threats? This is a question that we discussed academically until two months ago. It has now become uniquely and vitally important to us as a nation and as a service. I think it requires a unique answer. I believe we need a systematic approach of complementary security measures to put together an effective strategy of offense and defense on this multi-level chessboard. Of course, we need to think more seriously than ever about how to prevent, how to respond, and how to manage the consequences of any asymmetric threat and its attack. However, as every chess player knows, we need to think first about awareness. The old paradigm of prevention, response and consequence management must now become awareness, prevention, response and consequence management.

Awareness involves recognizing the threats well in advance and anticipating our vulnerabilities and doing something about it. It has to do with having access to detailed intelligence about our would-be adversaries and sharing that information much more effectively among federal agencies and with our domestic and international partners, both in the public and private sectors. Without better awareness of the domain in which we work, for us the maritime domain, we will be forced to take more stringent actions with regard to prevention and response that will close down our economy and threaten our economic security. I don't know about you, but I'm not interested in living in a country with militarized borders. That would be a very different America than the one that our founding fathers envisioned.

As I mentioned earlier, the goal of sustaining global economic prosperity implies a loosening of control at the borders, and on the other hand, ensuring maritime security to prevent catastrophic events suggests a requirement to tighten them. The concept I would offer to unite these goals is an idea that we have at least initially termed "Maritime Domain Awareness." It is unique in that it applies specifically to our maritime borders and exclusive economic zones. Maritime Domain Awareness would be the umbrella that covers all the information requirements of anyone with any responsibility for homeland security in the maritime domain. Applied to the government interest of getting more cargo through customs and Coast Guard inspectors in less time with greater

security, I think its key elements would be these:

- An integrated, accessible database of information poured into by many and accessible by those who need it to get their job done better;
- One-stop coordinated inspections;
- High-technology sensors, readers, gamma ray scanners;
- Very solid and well thought-out risk-based decision-making forums charged with taking on and solving problems.

As we get better at collaborative approaches to maritime security issues, we quickly realize how many agencies and companies have important roles and how varied and complex their information requirements are. Imagine for a moment the information needs associated with a hypothetical 6,000 TEU flag of convenience containership with a multinational crew, cobbled together by a hiring agent who works for an Algerian vessel operator who chartered the vessel from a Greek ship owner whose corporate offices are in the Cayman Islands. You know and I know that happens every day. How would you begin to manage the information required to prosecute an interagency response to any of the various threats that might be aboard such a hypothetical ship? These could include a report of a nuclear device being smuggled; chemical or biological agents; or any of hundreds of other possibilities, all the way down to and including jeans and Levis.

Maritime Domain Awareness can become the forum we use to get our arms around that issue. Its key characteristics would be a system that uses advanced technology to integrate the many and varied efforts of military services, civil agencies, and private sector entities: transparency in the domain from over there internationally to the U.S. port; collaboration among federal agencies; coordination among international, national and local interests; sensitivity to customer service; and risk-based decision-making and facilitation of the incident command system when incidents do arise. The folks over in the Pentagon would refer to this as "jointness plus", with an emphasis on the plus.

Maritime Domain Awareness tools would have to include solid vulnerability assessments with action plan follow-ups to our ports and a model port guide so that we would know what we were looking for when we did those vulnerability assessments. The model port guide would give special attention to security guidelines, given the challenges of the moment. We would have to exercise contingency plans after they have been built. We also need real-time cargo, people and vessel tracking systems and rigorous analytic models and simulations capable of producing tactically actionable products.

Perhaps the most important characteristic of Maritime Domain Awareness is that it is not just a system of technologies. It has to become an altered state of mind from what we have been comfortable with for so long. It is constant, unyielding vigilance, and you can't buy that. It has to come from within us as humans. Its most important

assets are the eyes and ears of people in the private industry who, by and large, populate and own our ports and waterways. It has to be based on solid interagency and private sector collaboration and coordination at the local level as well as at the national level, which we have found to be of enormous value through not only the MTSNAC, but also the ICMTS at the federal level.

Ladies and gentlemen, what I would like to leave you with is the notion that this is an all-hands evolution. Clearly, each of us has to find a way to make our contribution to this greater security profile for our country. I do believe that continuously advanced, integrated information systems offer us our closest point of approach to some kind of sustainable advantage against 21st century threats. They also offer us the best chance of managing the collaboration I spoke of earlier. This is an enormous undertaking. We knew it back in 1999 we, as MTS colleagues, first recommended it for the Congressional consideration.

Thus armed, I believe we could then take a solid risk-management approach to the many vessels approaching our country on a daily basis, to figure out which ones need to be boarded and where, based on the greatest threats they would represent in the risk-based decision-making paradigm.

We can also have a notion of incentivizing those who would do the right thing and challenge not only them, but ourselves, to find ways to identify the good guys and, in fact, help them get through the gauntlet they encounter in our daily port management processes.

As we gradually achieve greater maritime domain awareness, it will enhance homeland security by allowing us to push our borders offshore, away from the coastline, by sharing information on international arrivals and departures within the United States and among our partners around the world. I do believe, when done right and with that kind of information armament, we would be in the business of helping to prevent future attacks. It will also help us by telling us what is going on daily in our ports and waterways. Events that very well could have escaped the attention of many, only observable by some, but with an information system that is shared much more dramatically – we could all be privy to those pieces of information that might be helpful to us as we try to do our jobs. International and domestic cooperation, both civil and military, is essential in this regard because we can't hope to ensure our security by working alone or by waiting until the threats have already crossed the thresholds and are inside our ports.

Awareness is the key to preventing the potential threats from being realized and finding ourselves managing consequences when we could have been in the business of preventing things from happening. Better technology will help us forge a stronger key to that.

Thank you for your attention and I look forward to any questions you have and to the remarks from the other panel members this morning.

Summary of Q&A Session:

Q: You mentioned that one perception is that tight security works against free trade and slows things up. However, the

one place where you think there might be some common ground is information technology. Information technology is critical to improving the efficiency of the maritime transportation system. Information technology is critical to improving security. There is obviously a lot of overlap. My question is: How far do you think we have to go to improving the various information technology components of both to, at least on the security side, improve this awareness and be able to head off the most likely problems?

Loy: I wish I had a finite answer to that question, but I think we will all labor in the business of attempting to find the limit associated with the question asked. However, in the meantime, I think in our domain it is fundamentally about vessels, people and cargo. The first level of cooperation I believe has to do with forging a fused database that would allow a greater transparency and a greater visibility associated with the vessels, people and cargo that are coming in our direction. We have been working for a year now with a small group out at our Intelligence Coordination Center. (And, I can tell you that over the course of a year before that, we were not having an easy time finding the right sponsor that would advocate what we were trying to get accomplished.) However, we did, at the tail end of the last administration and about November of last year, begin this little cell of attempting to find out what is possible in terms of learning more about what ought to be in that fused database. We are working with INS and with the visa end of the State Department about the people piece. We, of course, have an enormous database, especially with our colleagues on the vessel piece, and the Customs Service is the lead agency with respect to cargo.

My notion is relatively simple. If we can find better visibility with respect to that which is coming in our direction -- the vessel with the crew on board and with the cargo on board -- then we have a better chance of making a thoughtful and appropriate intervention if one is deemed necessary. Some vessels become "high interest" just because of either their cargo or the number of people onboard. To me, a cruise ship with 4,000 people on it is, by definition, a high interest vessel in the security climate we live in today. As I mentioned earlier, as our first course of business over these last seven weeks, we have attempted to find ways to control the movement of high interest vessels in our ports. We are considering and moving forward on ideas such as Sea Marshals and Maritime Safety and Security Teams that can be deployed appropriately for intervention potential whenever that would be appropriate.

In the meantime, we need to gain better insight as to vessels, people and cargo. Frankly, I think the cargo piece is the biggest hole at the moment, specifically the 17 million containers a year coming in our direction -- 16,000 containers a day finding their way into U.S. ports -- being lifted onto trucks, trains or whatever, and eventually going on to their destination. Only 1-2 percent of these are physically opened to determine what is actually in them. We have to again find a way to reward the compliant good guys with an incentivizing process that facilitates their cargo getting past whatever the gauntlet might be at any given border.

However, we absolutely have to be concerned about high interest vessels plus. It is the "plus" piece that offers insights that can be gathered from a fused database when you have 12 vessels approaching the port of X on any given day – which one or two are we going to scrub to bare metal at the sea buoy to make sure that we have no problems based on what we know about the vessel inbound.

Let me give you a quick simple "for instance" -- let's take Vessel A coming from Lisbon to Savannah. In our database we know that the port of call before Lisbon was Barenquia, Colombia. We find out, as a result of the liaison we now have with INS and the State Department, that the third mate and the fourth engineer have records in drug smuggling. The Customs Service tells us they have some amount of concern about the fourth container over in the sixth stack that was put aboard that vessel in Barenquia. All of a sudden, we have not one little red flag (as was often the case in the past), based on where it had been before, but several red flags, some of which are outside the routine Coast Guard risk management decision-making process as to which vessels are cause for concern. For vessels that are outside the inventory of high interest vessels, a decision to take a hard look at a vessel that otherwise would have gotten through, will be based on three or more pieces of information.

I don't know what the limit of either the potential for information sharing and its value will be; but I'm absolutely convinced that to get on with that task an essential ingredient is this awareness piece. Personally, I'm convinced that piece was the failure we watched happen on the 11th of September. We have, as a nation, been in this prevention - response - consequence management paradigm for a long, long time. That is not what failed on the 11th of September. What failed was being inadequately aware of the domain in which we live and work so as to be better able to design prevention protocols or response protocols, should they become necessary.

I wish I had a finite answer to the question; however, I am absolutely convinced that information sharing of a highly sophisticated nature is going to be key to holding on to both a higher security profile and a facilitated commerce flow through our ports and waterways.

Q: In the discussion on homeland defense, we talk about the need to harden our ports domestically, but in fact, for any good security program here with regard to port security, we need to look at the ports of origin. Particularly in the discussion of WMDs, if a device is already brought into our ports, we may have already lost in our effort to protect against it. To what degree do you believe the Coast Guard needs to focus its attention on (1) identifying the vulnerabilities of foreign ports; (2) working with the IMO to establish minimum standards of security; and (3) provide such technical and financial assistance to foreign ports in order to bring them up to a standard comparable to what we enjoy here in the United States?

Loy: I'm not sure I want them to come up to the standard that we enjoy here in the United States. I think I would like to have them a lot higher than that. That said, your point is enormously on target.

This transparency piece that I mentioned earlier in my remarks is all about point of origin as part of the solution and the challenge that we have is an international challenge, not a national one. There are some very good voices with some very thoughtful and deliberate thinking going on as we speak. It is enormously important that it be an opportunity for as many good voices as possible to be brought to the table to figure out the technological end, as well as the conceptual, philosophical end. It is important to have confidence in the point of origin as part of the solution to the security profile and the security challenge we have here in the United States.

I called IMO officials on the 12th of September and said that it seems to me that the devotion that IMO has given to safety and environmental protection over the years has been good and we have all benefited from that. But, it also seems to me, in the wake of 11 September, that a third primary role that IMO can play (or certainly find room for within the structure of IMO's committees) is to pay attention to security – to make security a third major objective of the maritime sector's international standard-setting organization. I found that IMO was, in fact, already ahead of me in the mind-set with respect to this issue. IMO will introduce a major resolution at the assembly at the end of this month. In fact, I will lead the U.S. delegation over there for all next week and the following week. We have already orchestrated the initial interventions from the plenary on that occasion to challenge the process to not only be a focus of IMO's work, but one on an accelerated time schedule so that we are not looking at five years down the road to action. I want to have something happen in the way of an action plan right away.

I will introduce an intervention to that resolution that calls for intercessional work before the March meeting, on the way to setting the agenda for the MSC the next time around. That is a combination of committees and subcommittees. The legal committee will probably be involved; the facilitation committee will be involved; and probably MSC as opposed to MEPC. The notion of international reality and standard-setting is underway and I hope that will be a very aggressive posture that comes out of a resolution next week.

Thank you very much for your attention and I wish you well as we carry on the agenda of the MTS that we started several years ago.

WELCOME AND COMMENTS FROM MTS NATIONAL ADVISORY COUNCIL

Captain Michael Watson
President of the American Pilots Association

To begin, I would like to explain a little more about who the American Pilots are and what role we play in the MTS National Advisory Council.

As you heard, I came from the Association of Maryland Pilots, some of who are in the audience today. I've been a pilot there for 30 years and have worked actively with most all the members of the ICMTS in furthering safe navigation and commerce to our port in Baltimore, Maryland. The American Pilots Association consists of all the licensed state pilots in the continental United States, Alaska and Hawaii, groups similar to the Association of Maryland Pilots. As such, the state pilots in the United States handle all of the foreign flag vessels entering and leaving our country. We are the first American citizens onboard these ships, and currently act as the eyes and ears for the United States Coast Guard in working closely with them on security issues.

Of the cargoes mentioned, 95 percent of the commerce coming to our country comes by maritime means and we pilot 95 percent or greater of that commodity. Therefore, the American Pilots Association has a real role to play within the MTS National Advisory Council. You might take note in your pamphlet, there is a good publication – "What is the MTS?" I think it gives a good overview of the data and issues. I would like to focus on certain aspects of the MTS.

Admiral Loy and the Coast Guard have been doing a tremendous job since September 11th dealing with security and protection of the citizens of America. They have other jobs to do besides security, and I must tell you they have been taxed to the limit. We who use the waterways know we expected our buoys to be tended. We expected the fisheries to be patrolled, drug interdiction, search and rescue – and unfortunately, these resources have been tasked to provide security.

I am at liberty, not being a government employee, to urge all of you to support the Coast Guard, the Corps of Engineers, NOAA, MARAD, and their budgetary process not only now, but in the future, because the responsibility for the safety of our country, it is easily doled out in Washington, but at times I can look at Congress and be thankful that they are not military advisers on the field because we have been two months now waiting for a security bill to come through and the war still goes on.

I'm here on behalf of the Marine Transportation System National Advisory Council and there are issues of concern to us other than security, though security is the front burner today. Admiral Loy mentioned awareness – the marine domain awareness. I think the MTSNAC, working with the ICMTS, can do a lot to further awareness and to promote coordination among all aspects of our industry. I would urge everyone to get a copy of the MTS Report to Congress, which is an assessment of the U.S. marine transportation system. It

lays out the prime issues facing our entire marine transportation network.

The MTS National Advisory Council consists of 30 individuals involved in all the aspects of the intermodal system. It is more than just the marine end of the intermodal movement of cargo. It is the picture from the sea buoy to the consignee. We are looking at capacity needs in the year 2020, by which time it is predicted that cargo loads will double or triple. Can our ports and our infrastructure, the connectors, handle this type of increase in cargo flow and keep America competitive? Those are the issues we are working on. The entire industry – inland waterways, trucking, labor, ports, rail -- are all represented and charged with coming up with recommendations to Secretary Mineta to accomplish something similar to TEA-21 and AIR-21 --what the MTSNAC is calling SEA-21. This would facilitate funding beyond borders of marine, rail and truck, and coordinate the development of a very competitive and efficient network.

In the course of that development, technology plays an ever-greater role each day. We have cargo inspection for security and accountability, the movement of containers, the movement of bulk cargoes, liquid cargoes, the interaction with rail and truck -- the obvious solution is enhanced technological developments to speed the flow of these cargoes.

I believe there will be a lot of good things coming from the MTSNAC in the coming months. We worked several days last week to get the industry's opinion and approach to the security issue. This will be submitted to Secretary Mineta for his consideration. We are ever mindful of the financial end – we have to keep our national economy moving. Commerce has to keep moving and hopefully with the input of the private sector to the ICMTS, we can come up with a system that will provide security as well as the free flow of commerce.

Concerning the pilots, I think we are concerned primarily with navigational technologies such as NOAA's PORTS system. I was pleased to learn yesterday that this was the first resolution that the MTSNAC came out with prior to September 11 – to urge the Secretary to fund NOAA's PORTS system – real-time system – to increase capacity, cargo flow and safety in our ports. In the past, this effort has been neglected in the budget. Yesterday, I understand there was $4.0 million earmarked for that effort to continue and expand throughout the country, which makes the pilots very happy.

We are looking at the PORTS system, bridge air-gap sensors, electronic charts, radars, AIS and other shipboard electronics. In addition to navigation technology, this program covers the application of technological solutions to security, commercial information, environmental protection and other issues in our marine transportation system. There are formidable challenges facing our MTS and clearly MTS professionals will continue to rely on technology as an important tool to fashion to build our visions of the U.S. marine transportation system.

Again, I appreciate being invited to this conference. I think it will be three days of great exchange of information and

knowledge. And, I appreciate Admiral Loy and General Griffin for coming and hosting this. It is a real pleasure for me to work with them and I thank you for having me.

WELCOME AND ADDRESS FROM THE CONFERENCE HOST
"Overview of Current Corps of Engineers MTS Activities"

Brigadier General Robert Griffin
Director of Civil Works
U.S. Army Corps of Engineers

I'm delighted to be here on behalf of the Corps of Engineers, as a host for this conference. Although I had not heard Admiral Loy speak before, I thought his notion of thinking in terms of security and fast movement of cargo at the same time is very relevant right now. Civil Works takes great pride in the marine transportation system. It was pointed out earlier that the U.S. Army Corps of Engineers role in the marine transportation system began in 1824 with the Rivers and Harbors Act, so we have been at this for about 176 years. Even today, it remains our largest civil mission. The federal government this year is investing $1.8 billion in O&M work, which is 40 percent of the entire Civil Works budget. This means that when my colleagues, Barry Holliday and Charlie Hess, sit around and talk money, they are the big player at the table with 40 percent of our entire budget of $4.5 billion.

Given recent events and given the audience I have today, I want to report on how our military stands today. It is based on a capstone experience that I had – something that all DOD and USCG officers go through. It is part of a greening process where you go out and see how different services operate. I understand some of you are Captains and have been on vessels. I was particularly impressed with my visit to the aircraft carrier, the *Abraham Lincoln* off the San Diego coast. While they probably could have tied it up and taken us aboard, I realize now they wanted us to fly onto the carrier, get hooked on, and then catapulted off again -- it was part of the total experience. I'm sure they cranked the catapult up all the way for this little twin-engine plane. What I learned and I always took for granted was at that point our Chairman and Joint Chief of Staff said "Your military is ready." I came away from that experience, incredibly impressed. What I did not know – maybe you do – is that our aircraft carriers fly a 24-hour operation day, night, regardless of the weather. We are the only nation in the world that does that. It felt like it was routine because we do it so well and only rarely, very rarely, do we ever lose a plane. Thank God for that.

I am sitting there on an aircraft carrier of 5,000 people, commanded by a Captain, and ninety percent (90%) of the people running this ship are first-term enlistees. Think about that. They may be 19 years old if they are even that old -- many of them are 18, some are only 17. I'm in the pilothouse with the Captain and I look around and the pilot of this vessel is a 19-year-old from Warner-Robbins, Georgia. I notice a Quartermaster – she can't be any older than the pilot. In the Army, a Quartermaster is a logistician. They are the ones that keep the ship from hitting things, and we were around some islands. She was making sure this vessel was not going to hit anything as the pilot piloted the vessel. I was looking around for somebody in charge, and spot a bosun in the back who is sort of paying attention, but mostly not, and that is because he has a lot of faith in these young sailors. It was an incredible

experience. After this 14-day experience during which we saw the Marines, the Air Force, the Army, and the Coast Guard, I can tell you, we are ready and we are in great shape.

The overarching theme of the MTS is that the nation clearly will not be competitive if we do not invest in our water infrastructure as we have done our highway system. This is the group to make it happen. Somebody said, if not us, who? If not now, when? We're all aware of the highway system improvements and success under TEA-21 and ISTEA. There is a move afoot to work a SEA-21 and this is the group to make that happen.

I deal with locks and dams component of the MTS and other folks here deal with the piers and other components. The way our infrastructure degrades is not catastrophic. We don't have bridges where suddenly five cars fall in from 200 feet and it is all over CNN, triggering the action to make something happen. Waterway and harbor infrastructure is more a degradation over time where ports and channels silt up inch-by-inch-by-inch. It is not catastrophic; we just start light loading. We have locks that are almost 100 years old.

One of the most important things I have learned in this job is that there is no "Kodak moment" when it comes to providing O&M dollars. Since I've been with the Corps, the Congress will put money to new stuff because it provides that ribbon-cutting Kodak moment. It's hard to get them to put money in our aging infrastructure because it is not viewed as exciting. We have started to talk this theme -- everywhere I go I talk this theme.

If we can collectively work this SEA-21 issue, then we will have accomplished something. We need to focus on this vision for the future – the Marine Transportation System 2020 – that will keep our ports and waterways second to none. The Corps wants to do our part. We are committed to that. We work that hard. This vision is critical to meeting the MTS 2020 goals. We in the Army know you go nowhere without a map. You accomplish nothing without a plan. First you have to have a plan. As my deputy tells me in Washington – it is not brilliance that pays once you have plan. Do you know what it is? It is persistence. Therefore, we have to be persistent now that we have a plan.

I think the elements of the plan are very sound. The six elements that Admiral Loy mentioned –support a transportation system that sustains America's economic growth; promotes public safety; shapes an accessible, affordable, reliable transportation system for all people, goods and regions, including – and I read all the sub-strategies and they are very good – advanced transportation research. This is where you come in and it is the point of this conference – to share the research you are doing. For example:

- Develop and assess capacity and demand projections. We need all that or we are not going to be able to articulate the need for infrastructure investment.

- Protect and enhance communities and their natural environment

affected by transportation by including environmental features into MTS planning, development and operations. One area where we are working hard has been beneficial use of dredge material and that is going a lot better.

- Advance the system's ability to manage for results and innovation.

- Ensure security of the system and provide for homeland security and support national security strategy. It is ironic – that this is in there and is articulated so very well – even before 11 September.

I would like to talk about the Corps' part of this infrastructure security – we have anti-terrorism and force protection expertise. We have a protective design center of expertise. Some of you may know it; some of you may not -- but it is certainly offered to the members of the MTS. The protective design center was set up in Omaha, Nebraska. It includes about 26 engineers and was set up after the Beirut bombing in Lebanon. They do all the DOD forced protection work. When I commanded the Northwestern Division, I visited them and it is kind of like the Maytag repairman – you go through the facility and they are there and they are doing some work. You can't imagine the calls they are getting now – to draw on the expertise they have and some of the AE contractors they have. They are redesigning the Pentagon as we speak, to harden it and other facilities. Now it has gone beyond DOD into other infrastructure areas. That expertise is available to the MTS.

We also have electronic security centers – one of those is in Huntsville. Suddenly, we are getting calls from municipal water treatment plants: "Hey, can you come over here and take a look at this?" It is like that IT commercial where folks come in, advise that you ought to do this, this and this. They say okay, great, go do it. Well, we don't do that – we just tell you what to do. The good news with Huntsville is if they do advise you to do something, you say okay and do it, and they have a $200 million contract in place, so they can immediately turn the contractor loose to go do what they recommend. This kind of service is available to the nation at this time.

We have hundreds of engineers with experience at Khobar Towers. We were called out for that as well as the Murrha Federal Building, the World Trade Center, and the Pentagon. Over the past few years, the Corps with other agencies, including Bureau of Alcohol, Tobacco and Firearms, DOE, EPA, TVA, FBI – we developed this comprehensive security assessment and it is called a risk assessment analysis tool and while aimed at dams, it works for anything. It is called RAM-D. It was done in association with Sandia Labs. We tested it for a year and the report came out. If you can believe this – a systematic approach to analyzing infrastructure, figuring out risks, threats, and then what you should do – we actually published this at the end of August. We had one copy in our hands and as soon as 11 September broke, we have been asked for this thing all over the place. This is a tool we are now using.

In the Corps today, we are putting temporary protection measures in place.

We are doing restricted public access, increased standoff distance to critical structures – things we never considered before about certain locks and dams in remote areas. Increased patrol activities and contract guard support – we don't do our own guards, but we do have law enforcement contracts that we can now beef up and increase. We have increased coordination with law enforcement and early warning telephone structures.

Long-term, we are conducting deliberate infrastructure security assessments at our most critical facilities to ensure we have the right measures in place and, more importantly, the resources. In the end, it is all going to come down to resources and if we use this risk assessment methodology, we believe the answer we come up with can be justified and we are putting the money in the right place.

We are also coordinating with the Coast Guard, the American Waterways Operators and other members of the marine transportation industry to ensure safe, efficient movement of often hazardous cargoes on our waterways and in our ports. It is a challenge. Inland, tows will reconfigure and these hazardous materials will move around and it really is a challenge. What we worked out with the operators is pretty much the one-if by land, two-if by sea. We are the Army and we do pretty well at protecting the land side and we are working with the Coast Guard on the maritime side. This is on the inland waterways.

Regarding our current state of the MTS, certainly it is fulfilling its role. Approximately 90 deep-water ports handle the majority of import and export cargoes in the U.S. In addition, there are 30 ocean or inland ports that have strategic significance to the nation. When we talk Civil Works, we say it is in the national defense interest. It includes such complexes as Sunnypoint, North Carolina as shipping points for military and materiel. They are functioning well – handling about two billion tons of commerce a year.

In the Corps, we are reaching consensus on some of our toughest dredging disposal issues at such places as Oakland Harbor, where for the first time now we have not only the shipping industry, but more importantly, the Sierra Club is onboard with our dredging disposal plans. We are starting to see that around the country.

When I was in Cincinnati, we had been working in the area called Indiana Harbor in the southern part of Lake Michigan near Chicago. This thing had been working for 30 years and it continued to silt in. It was contaminated sediment. In the end, how we convinced the community to go along with us is, if you don't cap it or do something about it, it will wind up out in the lake and you will never be able to control it. While it is sitting there with the contaminated materials on the bottom of the canals it is aspirating, if you will, and people are breathing it in. Better to have it nearby and capped than in the water and a threat. They finally agreed to that after 30 years. There is another area where we can now dredge the port, contain the material so it is good for the people, it is good for navigation, good for the environment and good for industry. This is starting to happen more than ever in the past.

Also in New York/New Jersey harbor complex, we have identified opportunities to accelerate development of a 50-foot world-class port. The legislation we just got signed is going to combine about six or seven projects into one mega-project in New York/New Jersey port, which will be a great help.

Our 12,000 miles of inland and intercoastal waterways are also functioning well. Work continues on our inland locks. We are working at McAlpine, Olmstead, Monongahela River, locks 2-4 – that is on the Ohio, and then in New Orleans Inner Harbor Lock and Dam. We have about $15 billion backlog work with the Corps for navigation improvements. We are getting monies to move them forward, but not at the rate that we should.

We have also refocused the study of the Upper Mississippi and Illinois Waterway navigation improvements – the Upper Mississippi study that was in the paper and was stopped dead. I'm happy to report the study resumed in August and we will have an interim report in May 2002.

While that is the good news, we also have challenges on the MTS. As I mentioned, the extended and deferred construction schedules continue to delay projects from one to five years. Not only does it run up the cost of construction, but these projects are beneficial and we forgo these economic benefits every year that these projects are not completed. At the end of FYO1, the Corps O&M backlog stands at $425 million – that is critical backlog. With the budget we just got, although above the President's budget, our backlog will increase probably in the $600 million range. Deferring maintenance may save money in the short run, but over the long term, will result in lower project benefits and will affect the level of service to customers. Again, it degrades quietly and that is the problem. If we don't tell that story, it will not get told.

The nation's marine transportation system is stressed and may not be able to meet the 21st century demands. As was mentioned earlier, trade will double in the next 20 years and a lot of it will be borne on the navigation system – 90 percent. Larger and faster vessels will require reliable, deeper and wider navigation channels on the 50-55 foot depths. Maintaining harbors to move this trade freely while remaining good stewards of the environment will require creativity, cooperation and hard work. Failure to respond will create a second-class system with less competitive ports, higher consumer prices, less income for farmers (and that is what is happening on the Upper Mississippi), less economic growth and fewer jobs.

To help focus the nation's most pressing water resources needs, the Corps also held listening sessions separate from the Coast Guard, which I think were very good. Rather than folks listening to the Corps or the Coast Guard, we went to the public to ask, "What do you see? What are the needs from your vantage point?" In the 14 listening sessions, one of the areas addressed was the water transportation system. What did the public tell us? They said, modernize navigation infrastructure in sustainable ways to meet the growing global trade needs. Eliminate the backlog of navigation and projects. Do comprehensive regional port planning. Improve the process for dredge disposal

siting. Plan for mega containerships in ports likely to receive them. Seek contributions from those who directly benefit from channel deepening and incorporate environmental issues in studies and better coordinate across federal, state and local agencies regarding dredging contracts. These were the things we got on this segment of the marine transportation system.

Now that we have this information, what do we do with it? What we have done is we're working with our Assistant Secretary of the Army for Civil Works and the Office of Management and Budget to address these publicly stated needs in a Water Resources Development Act of 2002. We have gone to the public and we've heard them. Now we are incorporating that into our Water Resources Development Act of 2002.

I see this as a joint mission: all the agencies represented here and private industry. What we all need to do is leverage the various expertise in our own areas to achieve this MTS Vision 2020.

In closing, on 11 September 2001, the United States of America became a country at war. Our Post Cold War peacetime Army is now confronted with the challenge of winning a new kind of war on multiple fronts. Admiral Loy was saying, things have changed dramatically. I was in Germany as a Lieutenant – I almost wish for the old days when I stood on the border and the Russians were on the other side -- life was pretty simple. We were here. They were there. Hub-to-hub with tanks, no asymmetric threat, and the Russians had good control over all the bad guys out there. Now the wall has came down, nobody has control of the bad guys and they learned from Desert Storm, you do not attack – if they didn't learn anything else – you do not attack the U.S. tank-on-tank. You attack at their weakness and they learned that lesson very well.

Our success will rely, as always, on our people. Throughout American history, our people have always met the challenge of every crisis, every emergency, and every war effort. But, as President Bush has reminded us, in many cases, the best way we can support the war effort is to continue to function as a society and get on with our lives. My charge to you then is to look to the future and to respond to its challenges, not only national security, but also rapid economic growth and the need to ensure sustainable, viable maritime environment.

On that note, I wish you a most productive conference and I thank you for inviting me here this morning. There is great talent in this room. With you and with a vision, we will ensure our maritime system stays strong.

Thank you very much.

II. EXPERT PANELS

Six expert panels provided stimulating highlights of innovations currently taking place today and gave their thoughts on possibilities for the future.

PANEL 1 – SECURITY I

MODERATOR
Joe Cox, Chamber of Shipping of America

COORDINATOR
Jean Godwin, American Association of Port Authorities

PANELISTS
Edward V. Badolato, CMS Inc.

CDR Stephen Flynn, Council on Foreign Relations and U.S. Coast Guard Academy

Kim Petersen, Maritime Security Council

SUMMARY OF PANEL PRESENTATIONS / DISCUSSION
Security is extremely critical to the maritime community because our ports are vulnerable. Much of that vulnerability is due to foreign traffic as a large number of foreign-flag vessels from a variety of countries enter our ports daily to deliver imported goods or pick-up export cargo. We cannot compromise security for profitability. The panel speakers addressed the United States' concern with security among port entities and aboard these vessels.

Edward Badolato
In his presentation, Edward Badolato talked about overall maritime security, with a particular emphasis on port security, and provided some background information on terrorist activities. He noted that ports serve not only as America's economic engine but also as its most vulnerable gateways around the country. The laxity of American seaports remains an open secret among criminals – ports are potential targets for terrorists like Osama bin Laden, who maintains a ship fleet under various registries and looks at maritime transfers. Consequently there is a strong need for research and technology to enhance both port physical security and transportation security. Mr. Badolato identified five key research and development areas: (1) coordination of indication and warning systems; (2) container tracking systems; (3) container locks and seals; (4) rapid non-intrusive detection for nuclear, biological, or chemical precursors and explosives; and (5) integration of security and intelligence systems. His vision for the future includes an increase in terrorists' transportation infrastructure activities. It will be extremely difficult for law enforcement officials to detect and disrupt covert cells, so the overhaul and audit of port security systems will continue to be important and growing areas.

CDR Stephen Flynn
CDR Stephen Flynn opened his presentation by talking about the consequences of the terrorist attack on 11 September. The events clearly demonstrated that terrorists not only have a global reach, but they also possess the means (potentially using chemical and biological weapons) and the desire to cause catastrophic damage. The relative ease by which these hijackers perpetuated such a horrific act,

combined with the societal and economic chaos that ensued, will serve to inspire further terrorism. The resulting rise and political recognition of the value of security offers an excellent opportunity to fix things to make the seaport transportation process more efficient but also more secure at the same time. CDR Flynn spoke in favor of "former reverse profiling" where the ultimate objective should be concentric layers of inspections which assure credibility and legitimacy. To accomplish this feat, he outlined a three-tier system. First, in point-of-origin controls, the private sector must reduce the risk that they will be compromised by a terrorist or criminal when they enter cargo or vessels into our transportation system. Then, as cargo moves from the loading system, it must have "in-transit visibility and accountability" so that a chain of custody is well maintained. In the final step, we must assess the credibility of owners and operators. The various stakeholders must work together to fuse information – we cannot afford to look at port security or maritime security as isolated from a transport network, but rather it is one big system.

Kim Petersen

In his presentation, Kim Petersen reiterated a common theme in this panel by stating that the ports and maritime industry are the most valuable components of our national infrastructure, but they are also the most vulnerable. The devastating events of 11 September demonstrated that it is incumbent upon not only the shipping communities, but also the ports to review, analyze, and implement improvements in their physical, personnel, and information security programs. As a country, we have not provided the ports with sufficient standards and guidelines how to properly protect themselves from these new types of threats. The private sector possesses the real expertise for maritime security – the government must form a partnership with industry to share information and technology. The ports need federal leadership not only in the execution of their security plans but also in financing to secure the ports with personnel, software and hardware upgrades in the years ahead. In doing so, we must proceed with foresight and restraint – otherwise, we may find ourselves with the most secure ports but we must shut down these ports because we simply cannot operate because of the onerous conditions placed upon them.

PANEL 2 – PORT CAPACITY

MODERATOR
Rex Edwards, Transportation Consultant

COORDINATOR
Joedy Cambridge, TRB / Marine Board

CHALLENGE SPEAKER
M. John Vickerman, TransSystems Corporation

PANELISTS
Jim Brennan, Norbridge Consulting

Asaf Ashar, National Ports and Waterways Institute, University of New Orleans

Lauren Kotas, Canaveral Port Authority and American Association of Port Authorities

James McCarville, Port of Pittsburgh

SUMMARY OF PANEL PRESENTATIONS / DISCUSSION
This panel discussed the importance of port capacity development to the MTS from the perspective of port operators and users. The key issue was whether current and projected port capacity can accommodate future freight flows, and what policies are necessary to meet that demand. Panel members included consulting engineers and researchers, as well as port management personnel.

M. John Vickerman
The Challenge Speaker was John Vickerman, a port consultant with TransSystems Corporation. Mr. Vickerman noted that world trade is projected to continue its strong expansion resulting in 6-7 percent annual growth in U.S. container volumes. It will be difficult to match the doubling or tripling of container volumes over the next 20 years with a comparable increase in berths and terminals with land availability a major impediment. Will the U.S. port system be able to expand to meet this demand? How can the anticipated congestion be avoided or managed?

Increasing container vessel sizes pose another challenge to U.S. ports, as are limitations of the Panama Canal, landside access, and intermodal transfer facilities. Port productivity varies significantly between ports with Asian ports leading the way. There may be new technologies that will increase productivity with information technology perhaps the most important. Operational efficiencies such as transshipping containers to feeder vessels and barges might also increase capacity. Mr. Vickerman concluded by cautioning that a failure to make necessary improvements to the U.S. port system will have a significant impact on the country's trading and logistical capabilities.

Jim Brennan
The first speaker was Jim Brennan who directs the maritime and port consulting practice for Norbridge, Inc. He identified six major drivers of port capacity: physical, operational, environmental, security, commercial and financial. Physical elements of port capacity include limitations directed by equipment capabilities, land and waterfront availability, and harbor depths. Operational factors relate to how efficiently physical elements are utilized, while environmental factors

constrain utilization and are growing in importance. Security might ultimately be the most important of all considerations based on recent events with the impact on capacity depending on the nature of new security policies.

Mr. Brennan stated that commercial and financial drivers are often under appreciated and may have had the greatest impact on capacity in recent years. Commercial factors relate to the way the shipping lines behave and the way they decide to use a port terminal. He identified SeaLand's terminal in Hong Kong as a prime example of how capacity can be maximized if the user has berth productivity as a commercial objective. Financial considerations affect capacity by limiting the most efficient utilization of terminals because shippers and carriers are unwilling to pay the premium for service enhancements. If existing port and vessel capacity were better utilized, the high cost of building new mega-ships and mega-ports could be minimized.

Asaf Ashar

The next speaker was Asaf Ashar, Professor-Research for port and intermodal system operations at the National Ports and Waterways Institute of the University of New Orleans. Mr. Ashar noted the adequacy of the national port system depends on both quantitative factors (capacity) and qualitative factors (capability). Capacity issues relate to the amount of infrastructural and equipment components available at port terminals and connections to terminals; capability relates to their size – whether current terminals and connections are appropriate for handling the ships and cargoes they are intended to.

Mr. Ashar identified the key "capacity" elements of a port terminal (berth, yard and gate) and future changes to their use as they affect capacity. New technologies such as automated guided vehicles and new cranes can increase the productivity of berths, while user fees, improved container stacking, and increased use of off-terminal facilities can boost yard and gate capacity. Improvements in port capability will depend on future service patterns as affected by factors such as the expansion of the Panama Canal and increased transshipment and feeder services. He claimed that larger future ships are associated with increasing ship-to-ship transfers (transshipment), suggesting to consider for this purpose floating terminals, based on barges as the vehicle that transfer containers between ships. Less ambitious technology that may dramatically improve productivity is multiple lifting of containers, which is already partially practiced in several foreign terminals, where recent gantry cranes are specified at 72 tons.

Lauren Kotas

Lauren Kotas, the director of marketing and trade development for Port Canaveral, a major cruise port in Florida, was the third speaker. She stated that the cruise business is very profitable and is projected to continue strong growth in the U.S. market. Ports are competing hard to attract cruise services. The cruise industry has port needs that differ significantly from other port users. Although the capacities of the largest cruise ships continue to increase, harbor depth is not a significant problem due to the relatively low drafts of cruise vessels. Capacity requirements for cruise vessels extend well beyond the terminal where passengers are

transferred between ship and shore. Good landside infrastructure is essential. The entire port experience must be friendly, safe, efficient and comfortable to satisfy high-paying vacationers. Off-port infrastructure and services are also important as the cruise experience starts when travelers leave their homes. Adequate airline services and ground transfer services are essential, as is good road access for the large segment of the market that drives to the port.

Other areas of importance to the cruise business include efficient ship provisioning requiring nearby service businesses and adequate dock space for truck transfer. Availability of large volumes of water, handling waste disposal, providing good road signage, and amenities for the large vessel crews are also unique requirements for cruise ships. The security of passengers is vastly more important than that of cargo, and security costs are high as a result. The events of September 11 required an additional $1.2 million for Port Canaveral, four times the amount originally predicted.

Developing facilities and infrastructure for the cruise industry requires long-range planning and requirements for new designs continue to expand. Improved terminal designs, advanced baggage handling systems, and high security landscaped parking lots are examples of recent advances at Port Canaveral. Requirements differ depending on the type of cruise market with vessel size and length of cruise as key considerations. The majority of new ships being delivered are not the mega-vessels, but mostly small-to-medium sized ships (2,100 passengers and less) which are faster and can provide longer voyages. Longer cruises require fewer port calls, but more baggage per person, while also creating more idle time for terminals. In conclusion, when considering increasing needs for port capacity, passenger movement needs should be included in planning, budgeting, and forecasting. Seaports are diversifying their operations beyond cargo in an effort to replace diminishing funding and to "earn their own keep."

Jim McCarville

The final panelist was Jim McCarville, Executive Director of the Port of Pittsburgh and current President of IRPT – the association of inland rivers, ports and terminals. Mr. McCarville noted the importance of political factors in the development of inland waterway capacity. The inland waterway system has an aging infrastructure that is operating at or near capacity, but it must remain viable to support certain key industries and agricultural interests.

The definition of capacity is an important consideration. Seasonal peaking is a key problem with waterway capacity, so average capacity is meaningless for a lock and dam. Operating efficiency is important unless physical capacity can be expanded, and new services such as container-on-barge will create new demands on waterway infrastructure. Political support will be a key factor in developing the required capacity in the future.

PANEL 3 – SECURITY II

MODERATOR
CAPT Anthony Regalbuto, United States Coast Guard

COORDINATOR
Ric Walker, U.S. Coast Guard Research and Development Center

PANELISTS
John McGowan, U.S. Customs

Keith Seaman, USTRANSCOM

Carl Travato, Philadelphia Regional Port Authority

John R. LaCapra, President, Florida Ports Council

John Lynch, NAVFAC, U.S. Navy

Raymond Barberesi, Director, Office of Ports and Domestic Shipping, Maritime Administration

SUMMARY OF PANEL PRESENTATIONS / DISCUSSION
The terrorist attacks on 11 September 2001 caused the nation to focus on security issues, making the topic for this conference panel discussion very timely. The moderator, CAPT Anthony Regalbuto, started the discussion by highlighting several important security issues and initiatives within the U.S. Coast Guard to deter and prevent future terrorism -- critical infrastructure protection; port vulnerability assessments; maritime domain awareness; personnel credentials; and chemical, biological, radiological, and nuclear detection. His remarks set the context for identifying technology and research security needs from the USCG perspective. The other panelists outlined their own technology and research needs based on their experiences.

John McGowan
John McGowan serves as the Executive Director of Enforcement Programs of the Office of Field Operations in the United States Customs Service. He is responsible for providing national direction, development and implementation of the Customs Service's programs to interdict contraband in cargo and cargo conveyances entering and departing the U.S. Customs Territory.

Although his agency is responsible for 301 ports of entry (seaports, airports, land-border ports, and inland ports) in the United States, John McGowan focused his presentation on seaports because of the tremendous amount of cargo which moves in/out of these areas. He discussed how the terrorist attacks prompted the U.S. Customs Service to shift its narcotic interdiction capabilities as well as its trade fraud screening capabilities and start looking for different risks and different cargo. U.S. Customs has dedicated considerable effort to combat the new threat of terrorism, applying existing technologies and developing new systems which will allow its agents to better inspect, screen, and track container contents – not just for illegal narcotics, but also now for potential nuclear, biological, radiological, or chemical precursors.

Keith Seaman
Keith Seaman serves as Chief of Concept and Technology Team, Plans and Policy Director of the United States Transportation Command

(USTRANSCOM), Scott Air Force Base in Illinois. He is responsible for the USTRANSCOM's Joint Transportation Technology Office.

In his presentation, Keith Seaman provided a Defense Department perspective on transportation and logistics. The national security strategy requires the armed services to rapidly deploy soldiers and equipment worldwide, but the existing military and commercial transportation systems are ill equipped to handle such operations. How can we deploy faster and push equipment through our own commercial industry, which is a little bit more robust than most nations on the other side, and then project force out of this robust transportation capability in the United States into a very minor capability in some of those overseas locations? USTRANSCOM is trying to answer this question as it projects force through the commercial industry today and gets things to the fight. Mr. Seaman opined that there has been little research and development dedicated to improving our transportation capabilities – we must start to invest in these areas now. In doing so, we must be proactive in developing security technology so that we can safely transport our soldiers and equipment. However, this new technology must be non-intrusive, protecting the people in the trenches and yet allowing them to continue with their mission.

Carl Trovato

Carl Trovato serves as the Philadelphia Regional Port Authority (PRPA) as a Director of Operations. He offered an industry perspective on the importance of maintaining a reasonable balance between security and operations – port facilities must implement effective security measures and still facilitate expeditious trade/commerce. These tasks can be accomplished by funding existing security programs and developing new technologies that improve data collection of imported and exported goods and track vessel movements in/out of port. Since 11 September 2001, the PRPA instituted several security measures to prevent future terrorist attacks including the evaluation of its waterfront facility conditions, institution of new identification badges, and analysis of the present port security system.

John LaCapra

John LaCapra is a private attorney with nearly three decades of international business, seaport development, and cruise industry experience. He is President of the Florida Ports Council, a statewide management organization comprising 14 deep-water ports.

He described his organization as a facilitator, taking the tasks that the ports need accomplished as local entities and translating them to both the state and federal system. The events of 11 September prompted the federal government to institute new security measures and deployment plans but these actions cost money. Who will pay? How do we balance security with trade? The interested parties (including state and federal agencies, private industry, the armed services, and law enforcement) must work together and answer these questions. We must rethink how we move freight with the people who still demand better, faster, and cheaper. The needed technology is not new at all – it is shared information, planning, and communication.

John Lynch
John Lynch is a structural engineer working in the Naval Facilities (NAVFAC) Engineering Command, Engineering Innovation and Critical Office (EICO) located at the Atlantic Division in Norfolk, Virginia. He is responsible for the technical adequacy of all Naval shore facility engineering, design and construction criteria for structural engineering, force protections and physical security, which includes unified facilities criteria and unified facilities guide specifications.

During his presentation, Mr. Lynch briefly discussed his agency's five-phased waterfront security plan to deter, detect, deny, warn, and destroy any potential threats. He unveiled future measures to enhance security for waterfront boundaries and waterfront barriers – expanding communications systems, constructing waterside towers at selected piers, installing multi-level lights, and increasing harbor and landside patrols. In evaluating the required level of security, NAVFAC carefully considers and evaluates these important criteria: type of threat perceived, level of protection required, environmental impacts, and associated costs – initial, maintenance, and operational costs of the equipment.

Raymond Barberesi
Mr. Raymond Barberesi serves as Director of the Maritime Administration's Office of Ports and Domestic Shipping. In his presentation, he spoke about MARAD's responsibilities in the area of port security and how it fits into the MTS and the R&T roles in this forum. He discussed many security issues and initiatives: port security guidance, development of national planning guides and national security program, foreign port security, and port readiness. In developing new technology and initiatives, he stressed the importance of taking a holistic approach and considering the overall transportation system, not just individual parts. The federal agencies need to work together in this effort and share information. However, this technology development and information transfer must be accomplished in such a way that they do not adversely interfere with the commercial marine transportation system – it is not an easy task, but we must balance port security with national security and economic security

PANEL 4 – INTELLIGENT MARINE TRANSPORTATION SYSTEM

MODERATOR
CAPT Jon Helmick, U.S. Merchant Marine Academy

COORDINATOR
Alex Landsburg, Maritime Administration

CHALLENGE SPEAKER
Dr. Ashish Sen, Bureau of Transportation Statistics

PANELISTS
Anne Aylward, EG&G Technical Services at the Volpe Center

Henry Marcus, Massachusetts Institute of Technology

Duncan Wright, CSX Lines

Sandra Borden, Project Manager of the U.S. Coast Guard's Ports and Waterways Safety System

SUMMARY OF PANEL PRESENTATIONS / DISCUSSION
The distinguished panelists that comprised Panel 4 addressed issues related to the development, application, and value added by Intelligent Transportation System (ITS) approaches, concepts, and technologies in the specific context of the Marine Transportation System.

The moderator, CAPT Jon Helmick, began the session by delineating the dimensions of world general cargo trade, the magnitude of containerization, the current challenges of ocean carrier and liner port operation, the needs of commercial and military shippers, and the new imperatives of security that together increasingly drive the adoption of ITS in the MTS.

Dr. Ashish Sen
The challenge speaker was Dr. Ashish Sen who discussed how the events of September 11 gave new meaning for decision-makers to know as much as possible about the marine transportation system as they review and improve security measures. Timely, accurate, and reliable data are critical for decisions on maritime security, just as they are for all other aspects of the transportation system. Dr. Sen then outlined the Bureau of Transportation Statistics (BTS) responsibilities for improving the quality of transportation data, both within the Department of Transportation (DOT) and throughout the transportation community. It is the BTS's firm belief that making better data available to decision-makers will result in more informed decisions. Consequently, they are actively pursuing their mission of becoming the knowledge base for the MTS. They intend to work as partners with the entire maritime community (port operators, maritime agencies, and all levels of government as well as the transporter and shippers in the private sector) to identify the data needs of the 21st century. In these partnerships, they will not only identify data gaps but also collect essential data that are not being collected today and disseminate them widely. By working together, the BTS and their partners can produce higher quality data that can lead to a more secure and productive transportation system. In doing so, they will make

transportation better and improve our lives as well as those of future generations.

Anne Aylward

Anne Aylward of EG&G Technical Services at the Volpe National Transportation Systems Center, focused on lessons learned from experience in the evolution of landside ITS that might have application for the implementation of ITS in the port and maritime realm. She observed that although ITS development has encompassed the idea of intermodal transportation, this consideration has largely excluded marine transportation. Ms. Aylward suggested the need for dissolution of modal and agency "stovepipes" where ITS issues are concerned. In her view, problems in the advancement of ITS are more institutional than technological. Finally, she underscored the need for a coordinated national policy and a predictable funding stream for the development of information infrastructure.

Dr. Henry Marcus

Dr. Henry Marcus of the Massachusetts Institute of Technology discussed intermodal freight container and equipment tagging and tracking. He considered the costs and benefits associated with the use of various technologies that provide in-transit visibility within the supply chain, such as Radio Frequency (RF) and GPS tags. Emphasizing benefits of increased asset utilization, service quality, improved cargo security, and enhanced cargo monitoring capability, Dr. Marcus evaluated key economic issues associated with tagging and tracking devices. Dr. Marcus commented on the interoperability challenge, whereby various users deploy different technologies that are ultimately incompatible. Dr. Marcus concluded his presentation by predicting greater use of automated identification technology in the future, and by noting the need for more research on this topic.

Sandra Borden

Sandra Borden, Project Manager for the U.S. Coast Guard Port and Waterways Safety System, explained the essential mechanics and objectives of Automatic Identification Systems (AIS). She noted that AIS was developed as a means of improving marine collision avoidance, but that the technology has important implications for Vessel Traffic Services (VTS) and maritime security. Ms. Borden discussed the complexity of transponders in general and summarized problems related to a shortage of VHF frequencies to be used for communications of AIS transponder information. She described the process of securing international adoption of proposed U.S. transponder technical standards, and noted the Coast Guard's request to the International Maritime Organization (IMO) for acceleration of the schedule for implementation of worldwide carriage of AIS devices aboard ship. She closed her briefing with the assessment that AIS will prove beneficial for trade, transportation safety, and security.

Duncan Wright

The final panelist, Duncan Wright of CSX Lines, Inc., began by describing the typically fragmented nature of liner service company databases and the operational difficulties that derive from the existence of separate data collection and storage systems for individual business functions. He then discussed

the successful effort by his firm to integrate its disparate databases. Mr. Wright detailed the commercial benefits of this integration, including facilitation of Just-In-Time supply chains, inventory cost reduction, and improved productivity. He emphasized the fact that security is also greatly enhanced by the capability to acquire and process accurate information on the specifics of containerized cargo shipments and those who originate them. Mr. Wright explained the business rules engine that is embedded in the CSX system, which generates alerts based on correlation of such variables as container weights versus manifested contents, shipment origin/destination versus a shipper's historical patterns, and similar data elements. He concluded that much of the information technology being used in global intermodal transportation can be employed for security purposes.

A lively question and answer period followed the presentations, in which the panelists addressed inquiries from the audience concerning specific technologies, uses of information, and examples of ITS applications in the port and maritime environment.

PANEL 5 – COASTWISE TRANSPORTATION

MODERATOR
Paul Bea, Port Authority of New York and New Jersey

COORDINATOR
Tony Furst, Office of Transportation Policy, Department of Transportation

CHALLENGE SPEAKER
Harry Caldwell, Federal Highway Administration

PANELISTS
Bill Ellis, Port Authority of New York and New Jersey

Anatoly Hochstein, National Institute of Ports and Waterways

John Ricklefs, Moffat Nichols

Marc Stanley, Bollinger/Incat

James Wang, Greater Bridgeport Regional Planning Agency

SUMMARY OF PANEL PRESENTATIONS / DISCUSSION
The MTS has played a critical role in helping to close the overall gap between growing transportation demand and the capacity of our transportation infrastructure. Consider these facts: in April 2000, the National Defense Transportation Association's Military Sealift Committee released a report entitled *Maritime Policy Initiatives 2000*, identifying major issues facing the U.S. maritime industry and opportunities for strengthening the industry commercially. One opportunity is coastwise trade. The NDTA analysis found there to be particularly strong growth potential in the market, especially along the I-95, I-10 and I-5 corridors. In these coastal corridors, there is strong evidence of a capacity crunch. The Federal Highway Administration data indicate average annual increases in highway freight miles of 3-4 percent nationally. This will represent a 30-40 percent growth rate by 2010. Existing rail and highway infrastructure cannot handle all of this projected growth. There are obvious limits to how much we can increase the capacity of interstates and rail lines. The waterborne option, on contrast, has underutilized capacity. As vessel and cargo transfer technologies improve and new vessels such as freight ferries come into service, waterborne transportation will provide increasingly competitive service.

The expanded use of waterborne transportation options is not viewed as modal competition. On the contrary, the MTS initiative is seen as part of the cooperative transportation effort to maximize choice and provide a logical alternative to an impending transportation overload.

<u>Harry Caldwell</u>
The challenge speaker was Harry Caldwell who discussed how intermodal trade transport represents an important investment in the nation's future -- it is essential for economic growth and continental security. His presentation focused on two challenges, one technical and the other policy-oriented. He advocated the establishment of a framework for an integrated North American freight data and analytical capability – building a multi-modal investment performance system linked to

related transportation support tools and a strategic planning analysis network that will allow us to think intermodally. He also emphasized the need for policy coordination so that it is possible to maintain an effective and reasonable balance between freight productivity and national security.

Bill Ellis

Bill Ellis is Program Manager at the Port Authority of New York and New Jersey, in the port planning and development section. He talked about the Port Inland Distribution Network (PIDN), which fits within the context of a multi-modal performance system – specifically the coastal, water-based, MTS initiative to add capacity to facilitate and enable economic growth to occur in the nation. The PANYNJ planners envision PIDN as a mass freight transit delivery system from their hub port (a relay system) to Northeast port cities and up the Hudson River. There is a rail component as well. Public benefits include highway construction costs avoidance; transporting large amounts of containers currently moved by trucks and trains; lower emissions; highway congestion mitigation; and the sharing of growth and economic opportunities with other regional ports. Mr. Ellis strongly advocated the use of new technology in order to add value to the services offered and to drive down costs. They are currently still planning the system. They estimate it will be 3-5 years to start the services, not at every location but probably 2-3 barge ports and one or two rail locations. They will build on those successes and expand to new inland destinations, replicating the models that exist in Europe.

James T. Wang

James Wang is Executive Director of the Greater Bridgeport Regional Planning Agency, Connecticut. For his presentation, James Wang focused on the issues, planning, funding, implementation, process, and politics required to build a container feeder port for Bridgeport, Connecticut. Bridgeport would be connected to the PIDN service described by Mr. Ellis. Mr. Wang also pointed out that the container service by barge in New England states failed in the past 25 years without operational assistance from public sources. The Bridgeport project will use federal/state funds to stimulate such operations similar to public transit services.

Anatoly Hochstein

Anatoly Hochstein is Director and Professor of the National Ports and Waterways Institute, associated with the University of New Orleans. In his presentation, Anatoly Hochstein introduced a concept, which addresses coastwise shipping of freight, including both domestic trailers and international containers. Moving the containers by high speed Ro/Ro ferries along most congested coastal highways make this type of service compatible and competitive with traditional domestic land transportation. The concept envisions a series of ferry terminals along the coast, outside, although desirably adjacent, of ports serving international trade. Such terminals need not be of large size and could offer considerably lower costs for construction and operation. If implemented, this concept would be beneficial for increasing the volume and functions of domestic water transportation as well as overall national intermodal system. Benefits include relieving highway

congestion; contributing to better environment; developing a reserve of craft and mariners for mobilization during emergencies; and providing more flexibility and security to the entire transportation system. He stressed that it is not intended to compete with the trucking industry but rather serve this industry, increasing the truck sector's intermodal options to deliver goods with the same frequency and delivery time.

John Ricklefs

John Ricklefs is a consultant for the Port Authority of New York and New Jersey's Port Inland Distribution Network (PIDN) project. He gave a presentation on the Port of Davisville and its potential functions within the PIDN system. In doing so, he highlighted several important issues: time, empty container management, chassis management, and value-added services.

Marc Stanley

Marc Stanley serves as Executive Vice President of Bollinger Shipyard for government and international affairs. His company constructs fast ferry vessels and sees the potential for moving freight on fast vessels of similar design. During his presentation, he discussed displacement vessel design from a shipbuilder's perspective. Ship length, geographic location, weather problems, and waterway restrictions are several factors considered in designing a ship for high-speed coastwise transportation. He then provided some specifications and information on a vessel that his company recently leased to the U.S. Army and U.S. Navy. This 112-meter craft can carry one thousand tons at 40 knots for 1000 miles. It features a high-speed wave-piercing platform, which is stable in fairly severe sea states, adaptable to extreme port conditions, and operates in water depths of 12 feet.

PANEL 6 – MTS USER NEEDS

MODERATOR
Jeff High, U.S. Coast Guard

COORDINATOR
Bruce Parker, National Ocean Service, NOAA

PANELISTS
Glenn Ashe, American Bureau of Shipping

Jonathan Benner, INTERTANKO

Barry Holliday, U.S. Army Corps of Engineers

Peter Lehman, American Association of Port Authorities (South Carolina State Ports Authority)

Leo Penne, American Association of State Highway and Transportation Officials

Mike Watson, American Pilots Association

Chuck Carroll, National Association of Waterfront Employers

Ed Mortimer, U.S. Chamber of Commerce

Ed Welch, Passenger Vessel Association

SUMMARY OF PANEL PRESENTATIONS / DISCUSSION
The theme of this year's conference was "Meeting the Needs of the Marine Transportation System Through Research and Technology" and thus, user needs were discussed in all the panels and technical sessions to some extent. However Panel 6, the final panel of the conference, was devoted exclusively to MTS user needs. The nine panelists represented the entire breadth of the MTS, and each provided insights into some of the needs within their particular sector.

Glenn Ashe
Glenn Ashe is the Director of Government Operations for the American Bureau of Shipping (ABS) and heads their Government Operations Office in Alexandria, Virginia. His presentation focused on marine safety and environmental stewardship which, from his perspective, hinges on the establishment of a process whereby the acceptability of assets (such as a ship or port) can be measured against an accepted set of standards. This system would provide a baseline for them to fulfill safety and environmental stewardship obligations to the public at large while still being assured that competitive advantage will not be garnered by someone who does not. Research and technology are two important drivers behind standards development for such a process. Organizations such as ABS are strongly committed to research and technology, making sure that they can provide the industry with the tools they need to make these measurements and meet standards. As technology progresses, such efforts must focus on risk-informed or risk-based methods in order to maximize both cost and technical effectiveness.

Jonathan Benner
Jonathan Benner is a Partner with the Washington office of Trout and Sanders. He represents INTERTANKO, the

International Association of Independent Tanker Owners. He presented a list of wants/needs that his organization would like to see. These needs include improved navigational charts and displays; competence assurances for transportation personnel; safe berths and terminals for tankers; better traffic management systems and information systems for vessel masters; increased communications between government agencies; and MTS standards and requirements uniform to other countries. He admits that these needs are parochial, but they contribute to promote national interests, security, and commercial success, both for vessels and for the commerce of the United States.

Barry Holliday

Barry Holliday is the Chief of the Navigation and Operations Branch in the Operations Division in the headquarters of the U.S. Army Corps of Engineers (USACE). The MTS is an integral part of the issues surrounding the environment and the impacts on developing the viable waterborne transportation system, one of USACE's main responsibilities. There are many sediment issues associated with MTS and in dealing with them, USACE is expected to generate responses/solutions which are both economically beneficial and environmentally sustainable. To meet these challenges, it is necessary to develop management solutions that consider economic and environmental impacts. We need research and technology that focuses on long-term morphological models, in scales not studied previously, and then create companion environmental efforts and response models. We also need to better leverage other agencies' technology, research, or other applications, in order to improve future efforts. Despite the many challenges ahead, USACE remains committed to its mission of maintaining a viable federal infrastructure to support the future MTS.

Peter Lehman

Peter Lehman is Director of Planning and Business Development at South Carolina State Ports Authority. In his presentation, he offered some talking points on capacity, congestion, and security needed to create an efficient transportation system. In a May 2000 study, the issues of port access and intermodal connections and intermodal transportation planning/system capacity analysis were identified as the top priorities for American ports. Since the terrorist attacks, the top issue would probably be how to enhance seaport security without impeding the flow of commerce. Mr. Lehman maintained that we must balance security with efficiency and productivity. In doing so, we must view the transportation system as a whole entity that is only as efficient as its weakest member. Despite events of 11 September, his organization remains committed to the MTS goal of creating by 2020 the world's most advanced, secure, and efficient system for moving goods and people.

Leo Penne

Leo Penne is the Program Director for the intermodal and industry activities with the American Association of State Highway and Transportation Officials (AASHTO). Mr. Penne's presentation revolved around AASHTO's transitioning view of the transportation business as one system. His organization, in trying to engage with the congestion capacity problem in its traditional area of responsibilities – the

highways – is becoming intermodal and in doing so, it is incorporating the marine transportation system into its vision for nation's future transportation system. He identified connectors and corridors as two areas that will require transportation research and technology development.

Mike Watson

Mike Watson serves as President of the American Pilots Association (APA). In his presentation, he noted that implementation of navigation technologies holds great promise as an important piece to publicize our desire vision for the MTS. The APA continues to dedicate its resources and expertise to be a strong advocate for the application of technology such as GPS and the increased availability of differential global positioning systems. Accelerating the development and delivery of these navigation technologies is critical to our ability to move our country's increasing waterborne commerce safely and efficiently. We must note that there is danger in not recognizing the limitations of technology. With the challenges facing MTS, perhaps even more importantly with the recent realization of our industry's vulnerability to terrorism, this country needs to reconsider its national security and economic interests.

Chuck Carroll

Chuck Carroll is an attorney and the Executive Director and General Counsel for the National Association of Waterfront Employers. Mr. Carroll talked about the impact of the 11 September attacks on infrastructure. The federal government has placed increased demands, both statutory and regulatory, on the maritime industry to provide information such as container content documentation and personnel credentials. It is imperative, as a matter of technology and research, that we can interchange computer databases between the private sector and government. The federal government should take the initiative to develop and implement a system needed to share this information. In this way, agencies can make informed, sensible decisions to ensure the security of the ports and national transportation system.

Ed Mortimer

Ed Mortimer is the Senior Manager of the Transportation Infrastructure Department at the United States Chamber of Commerce, where he is responsible for transportation policy. During his presentation, he voiced his agency's concern about the future of our marine transportation system. Based on data from the Department of Transportation, the amount of freight entering this country will double by the year 2015. This increase will only exacerbate the current capacity crisis in our nation's ports and inland waterways. The U.S. Chamber of Commerce is actively involved in addressing this problem. They recently conducted a study to look at sixteen port areas around the country, looking at the current infrastructure and freight loads and then formulating ideas what to do when the amount of freight doubles in 2015. The U.S. Chamber of Commerce also organized broad coalitions --comprised of representatives from the business community, state and local governments, and transportation users and providers – to press Congress for money and economic stimulus packages. There is no way better to improve our economy than by providing a better infrastructure

system so we can move our freight and improve the mobility of our people.

Ed Welch

Ed Welch spoke in his capacity as Legislative Director for the Passenger Vessel Association, expressing his organization's interest in data collection and vessel emissions. He recommended that the government and maritime industry expand their efforts to collect good data about the domestic passenger vessel service. This data must be continually updated and refined on a regular basis. The better data will help the interested parties to determine what is the appropriate role of domestic passenger vessels and ferries within the MTS. Mr. Welch also advocated for more research funds to quantify vessel emissions and determine ways to reduce such pollutants. He concluded his presentation by talking about security, how ferries and domestic passenger vessels serve as valuable emergency assets during catastrophes but they are extremely vulnerable, given the large volume of passengers and cargo that they handle.

III. CHALLENGE SPEAKERS

The transcripts from the three challenge speakers are provided below:

"MTS Capacity Problems: Real or Perceived?"

M. John Vickerman
Principal, TransSystems Corporation

My job is an easy one this afternoon – to pose some questions and hopefully all the wisdom and answers will then flow from the esteemed panelists in their views. The topic is "MTS Capacity Problems: Real or Perceived"? Do we really have a problem or not?

My first question is can the U.S. marine terminals really accommodate – I know they are anticipating it – but can they accommodate the future freight flows? What is the magnitude of those flows and is there a pragmatic way they can be handled in an efficient way?

The World Bank tells us that the productive work product output will increase 33 percent in the next 10 years, running to about $40 trillion. This is certainly a long-term view and doesn't take into account some of the early or short-term dynamics. But, clearly it is an indicator of the richness and vitality of the world global trades.

If we look at the Asian ports, which are fueling most of the trans-Pacific growth, we see some phenomenal increases just between now and the year 2005, for the North American Pacific Coast, due only to Asian imports. We are looking at somewhere between 35 percent and 42 percent increases in trade.

Let's consider the forecasted demand for the Panama Canal and forecasted transits to the year 2040. If we really look at where we are today and we look at all the variety of vessels moving and transiting the Panama, we see that their growth is somewhere between twofold and fourfold; however, none of those lines decline. In fact, the vessel transits through the Panama are all increasing over time, particularly container vessels. It was the fourth most frequently transited vessel in 1980 and in the year 2040, it will be king.

If we look at the containerized world trade, it has been growing at about 8.5 percent compounded annually and has not decreased since the inception of the container, and is in fact under the long-term scenarios, will continue at about this rate. By the way, the U.S. growth rate for containers is about 6 percent, or two-thirds of the global world market growth rate.

If we look at the U.S., we see for nearly every trading and port competitive range, that the growth is between 6-7 percent compound annually, and what this means is that by the year 2020, every U.S. container port gateway, provided they want to maintain market share, will either double or triple in volume. I've always said that I don't believe it is possible to double or triple the number of berths or terminals to meet this demand. Therefore, at least in my estimation, we're going to have some hard times in terms of accommodating this growth.

An illustration of this using the worst case scenario, assuming that the Asian flu continues, and is steady state, the growth in the combined ports of Los Angeles and Long Beach looks like a quadrupling of trade to the year 2020. Half of it is an intermodal/rail split phenomena. The capacity of the current port is roughly as you see it, which means we have a twofold increase. By some estimates, using the Port of Long Beach as an example, at around the year 2006, the port may be hard-pressed to develop any further marine terminals to suit this demand. This is the lowest, most conservative, worst-case, Asian flu continues, dynamic. I would show you the other one, but it wouldn't fit on the screen.

What are the implications for that? At the current productivity per acre, there is about 3,600 new acres required. I happen to be the project manager on the 2020 plan when 2,500 acres, which is currently under construction now, was conceived of in 1987. This means these port terminals will have to be outside the breakwaters, or somewhere else. A lot of land – a lot of terminals just to meet the conservative dynamic. If we go to the other coasts and we look at New York and New Jersey, specifically at the forecasted demand for containers based on vessel channel dynamics – that being 50-foot channels. The current capacity of the combined ports of New York and New Jersey, including the New York institutions, if we look at a 2040 horizon, we are going to see a fourfold increase. It really doesn't matter whether we have 50-foot channels, 45-foot channels, or we don't do anything about the Kill Van Kull – we leave it the way it is – the growth is up.

This phenomenon on projections is also applicable to the military. If we look at the Army's strategic mobility issues, their desire is to reduce deployment times by about 80 percent and do it on top of, or in concert with, commercial ports without disruption. If we look at our last war, we had a benevolent opponent who said why don't you just take 180 days and get your logistics together. If we look at the current dynamic, 5 1/3 heavy divisions, about two LMSRs per heavy division, the target goal right now is about 75 days and the Army Chief of Staff believes that has to be done in 30 days. There are some proponents of this that indicate it needs to be below the 30 mark. If we couple just the general merchandise container traffic illustrated earlier, plus all the neobulk, breakbulk, liquid bulk, and a variety of others, and on top of that, put a military movement on top of our preauthorized load-out ports, we have a substantial task in front of us.

Can the U.S. ports handle the continuing growth of vessels? Here again, I'll use the container vessel as an illustration and the shore-side demands that new vessel configuration will have on our ports. If we look just last year at the major alliances, the five major alliances shown in white, and we look at all of the vessel ordering, and this was to about June last year when we were still in fairly positive economic times, before the recent turn-down occurred, you can see at the bottom here that about 147 vessels with a capacity of nearly 700,000 TEUs were put into place or ordered. This is a 28 percent increase among all of the global alliances worldwide. This is a significant ship order placement.

Although some of those carriers have withdrawn the orders because of the economic as well as the recent events in September, it is still a daunting task. Despite very low financial returns, the liner industry continues to build bigger vessels. If we look at China Shipping's order of 9,800 20-foot equivalent units exceeding the largest vessel afloat by 2,000 TEUs in the year 2004 delivery, gives us an indication of the wave to come, although it may be mitigated or moderated because of the recent events.

We look at shipyards and what they are currently planning for. They are looking at about a 9,000 TEU jumbo vessel, propelled by a 93,000 hp engine, the largest low-speed diesel engine ever created in the world, and has drafts of approximately 48 feet. This 48 feet, plus two feet of under-keel clearance and two feet of vertical ship movement (something we affectionately refer to as squat) would mean that we need more than 50-foot channels in most of our strategic ports – a phenomenon that does not exist today.

Back in the 1970's, a very important guide to planning ports said you shouldn't anticipate a vessel being larger than 3,200 TEUs. The reality today is 6,000 – 8,000 TEUs, and the long-term possibilities is 10,000 – 15,000 TEUs, and we are approaching the 10,000 TEU threshold as we speak.

Is there a larger vessel out there? Several companies, including a German shipyard, have indicated this vessel is possible. It has a beam of 226 feet. If I plot the Miraflores Lock in the Panama Canal, the maximum through the lock – 13 containers wide. This vessel has 28. This is a significant issue. You might note the draft has gone down a bit – a very famous naval architect by the name of Archimedes, indicated that the displacement draft for a vessel is only a function of displaced water, and as you get wider and longer, we actually have a depression on the draft requirements.

If you take a 10,000-foot vessel, you balance imports and exports, and you use a 75 percent intermodal split, which many of the modern West Coast terminals are doing today, you end up getting about 13.5 – 10,000-foot long unit trains in and out every vessel call. It generates about 6,000 units and 26 trains two miles long for every vessel call. If we look at their requirements on the apron and we look at the congestion on the gate, the picture of the newest marine terminal in Los Angeles (APL's Pier 300), we see there is a peaking characteristic on the wharf, as well as at the gate, and with the megaships and the offload and the evolution of ships, it causes us quite a bit of concern. Can we accommodate this requirement with the current capacities in the port?

Let's talk a little bit about the cruise sector. Lauren Kotas is on the panel, and in her own right, an expert in the cruise market. The question there is will the changing vessel requirements in the cruise industry change U.S. port facilities? We certainly know that the terrorism issues have changed the dynamics, and in fact, have certainly reduced dramatically the patronage of cruise in the Mediterranean with a streaking-out of that region toward U.S. domestic markets for cruise potential.

Let's take a look then at some of the venues here. One of the largest vessels afloat, nearly 5,000 aboard this

particular vessel, uses Azipod propulsion, electric pulser drives, and is a very large vessel. In fact, it is the traditional hallmark of hubbing for cruise activities. If we look at a recent project that the Port Everglades complex has looked at, it is looking at investing $500 million in its recently completed strategic plan to accommodate on-ground passengers of 75,000 at peak flows. This is the concept for a simultaneous loaded discharge of nine Eagle class vessels at peak cruise day, assuming that the cruise lines will not adjust or will not accommodate variants or widening of their vessel deployment schedules away from the weekend. There is also an emerging mini-cruise market and expeditionary market with smaller vessels, all exterior bunks or cabins and lowers, and is a popular emerging new trend.

What is the U.S. productivity and our capability? If we look at the late 90's and we look at our ports and measure it in 20-foot equivalent units per acre per year, we see that the West Coast ports, primarily because of intermodal load-outs, are substantially higher than the East Coast. The average is about 2,100 TEUs, Europeans being about 3,000 TEUs and the Asian ports at about 9,000 TEUs. That is average. There have been some major developments in that regard and using Jim Brennan's recent analysis on high transshipment ports, that is mother-ship to feeder or barge, if we look at that dynamic, we see the U.S. ports non-transshipments to other ports, or at least transshipment is not a specific major issue. If we look at the world ports with transshipment, we see there is actually an increase of 400 percent in the throughput capacity capability of the very best terminals we have in the United States compared to transshipment focused, intelligent transport operations using transshipment modes. Perhaps what was intermodal yesterday might be termed transshipment tomorrow.

Landside access demands continue to increase. Using the latest FHWA freight framework analysis and looking at the 2020 truck flows using incremental increases above today's volumes, we have significant flows, particularly trucks from NAFTA – both Canada and Mexico. We have the unique capability now to run it by value, by port of entry, and we can even look at narrowing choke points within the system using this database.

If we look at rail traffic, we see a substantial increase potential there of about 48 percent, associated with tonnage on the railroads. We know the railroads have historically been moving east/west on the double-stack container network. In the last couple of years, we have had some emerging north/south corridors that will drive trade deeper into our heartland. The NS/CSX split, CN/IC's $3.0 billion merger, and in fact, CN/IC's recent acquisition of WC of about $1.5 billion, for a total investment over the last five years of $5.0 billion, is a substantial artery connection to our major ports of entry. All we can judge from that is it is going to get really congested out there, not only at our ports, but around and the hinterland and the landside access that is associated with it.

Are there prospects or are there things that could mitigate this? Are there issues that can help us solve this? Clearly, some of the research that our panelists will talk to us about today will

tell us that perhaps there are some technologies out there. I happen to be one that believes in information technology as a major empowering element for shortfalls in port capacity. The real question that most shippers have is where the heck is my cargo. I really don't care how it gets there – train, truck, ship – just get it to the consumption zone intact, good quality, just-in-time, with value and perception of quality service as needed. The rest of the logistics is really unimportant other than that last activity.

If we look at the railroads and the maritime interests and the trucking interests, they have developed over the last couple of years multi-carrier, neutral information tracking platforms that allows us to see freight data, with high fidelity, through legacy systems from origin to destination. They offer, in fact, secure internet capability in that transaction, and we are now seeing at least the beginnings of a nucleus of private sector offering the ability to control and move cargo. We all know in the container industry that the most frequently moved commodity in a container is air. We believe then that better resource management through information might help the capacity issues in our ports.

The Port Authority of New York/New Jersey's freight information real-time system for transport (FIRST), which America Systems, Inc. has put together, is one of those real-time, web-enabled information platforms that will allow for a variety of capabilities directly to not only the shipper, but the carrier and the various elements using through legacy system information transmission. We do know from that if we can have consistent, accurate, real-time CONUS data from both the ship and the train, that for the first time in our country we will be able to effectively use that information to increase capacity at the node, at the port. We believe there are major terminal benefits in that regard.

In another session, you will see some technology that relates to agile port IT technologies that take this a step further, and in fact, has looked at increasing terminal capacity by nearly 200 percent without building anything through the better use of information, reducing terminal congestion, fewer equipment needs, and reduced acreage as well as reduction in port access. The concept of taking empties to a remote inland site has also been experimented with and will be a tool to help our ports be more productive.

Lastly, let's look at the inland side of the equation. In my view at least, there is an emerging viable feeder service, both coastwise as well as inland intermodal barge services. There are many members in the audience who are actively involved in current coastwise trade and transport. There is, in fact, a growing belief that the mother ship to feeder vessel or barge, and the return of the mother ship back for reloading, will in fact improve the economies of the mainline carriers if, in fact, there is hub-and-spoke coastwise inland intermodal service issues. But, the demise of container-on-barge particularly has always been the long transit distances, the inability to provide consistent scheduling and frequency when needed to meet just-in-time requirements. Those constraints are coming away from the system and, in fact, we see an emerging viable opportunity here. One

illustration actually has a pre-committed doublestacked train that would allow feeder services and cross-river services for multimodal capability.

With that, I will just tell you that it is, in fact in my opinion, that what we have here is a real dilemma and if we are not careful about how we judiciously commit to improvements in our port and marine facilities, we will, in fact, deleteriously affect the trading capability and the logistics behind our entire infrastructure. Thank you very much.

"Maritime Data for the 21st Century"

Dr. Ashish Sen
Director, Bureau of Transportation Statistics

I'm delighted to be here. My acknowledgements to Admiral Pluta, the Chairman of the Interagency Committee for the Marine Transportation System, representatives of the MTS National Advisory Council, General Robert Griffin from the Corps of Engineers and our host for this event, and Bruce Parker, Chair of the MTS Research and Technology Subcommittee. I think you're doing great work to increase the awareness and importance of our maritime system. I don't think it is a big secret that much more attention should be paid to our maritime system.

Speaking on behalf of BTS, I would like to pledge to work with the maritime community to get more statistics out there to demonstrate the importance of the MTS. One way to bring prominence to anything, to bring focus to it, is to get more numbers in it. We can all provide examples of where once you measure something, people suddenly start paying attention to it. There is a saying within the USDOT – it used to be posted on the wall of the Assistant Secretary for Budget and a lot of people have claimed authorship for it: "What gets measured gets funded." I think what gets measured also gets noticed.

The events of September 11th increased attention to the need for decision-makers to know as much as possible about the system they review and to improve security. Maritime security is a critical element of the new world we found ourselves in on September 11th. President Bush said we are in a two-front war and one front is the home front. As Transportation Secretary Norm Minetta said, we have entered a new era in transportation. He called for us to re-think the basic approach with which we will provide for the safety and security of America's transportation system. Timely, accurate and reliable data are critical for decisions in maritime security, just as for other aspects of the transportation system. BTS is charged with improving the quality of transportation data, both within DOT and throughout the entire transportation community. It is our strong belief that making better data available to decision-makers will lead to more informed decisions.

We are actively pursuing the BTS mission of becoming the knowledge base for the marine transportation system. We intend to work as partners with the entire maritime community – port operators, maritime agencies at all level of government, as well as transporters, shippers and the private sector, to identify the data and needs of the 21st century. We intend, in

partnership, to identify data gaps to collect essential data that are not being collected today and disseminate them widely.

BTS engages in a wide range of transportation data activities. We publish yearly updates of statistics such as the Transportation Statistics Annual Report. The latest volume will be coming out in a new format in a few days and you might find that interesting. For those of you who have seen previous ones, this one looks like a compilation of briefing papers. It was a very quick way to get a sense of where things are. This publication is fairly widely read on Capitol Hill and, in fact, people there found out in 1997 for the first time that China displaced U.S. in the world's leader in container traffic.

BTS also publishes the National Transportation Statistics – a compilation that allows cross-modal comparisons. It is a useful volume to have on your shelf. In the current issue, you will find that more than one-quarter of the crude oil in petroleum products transported in the U.S. moves on water with comparisons to other modes. BTS also operates the National Transportation Library, which is a virtual library of transportation documents on which I feel we have made significant progress. You can access somewhere between one-half million to one million abstracts on all fronts, and a lot of full text documents. It is just about to move from what you might call a prototype to a real thing, and I encourage you to take a look and accessing it through the BTS website.

BTS also performs surveys on many transportation issues. Probably our best-known survey is the aviation delay statistics and currently probably our most useful survey. It is also one that gave me a lot of grief in recent days while trying to find a way to distribute the $5 billion in airline support following September 11. How to distribute it and what formula should be used requires making certain the numbers are correct. Where money is involved, data quality becomes even more important.

Earlier this year, BTS joined with the Maritime Administration to conduct a survey of mariners on the readiness of merchant mariners to sail on large oceangoing vessels. I am happy to report that two-thirds of the mariners, many of whom are in shore jobs now, would be willing to take an afloat position in the event of a national defense emergency. In fact, one of those numbers from this survey has had a lot of play recently in discussions with Captain William Schubert, our new MARAD administrator.

Every month, BTS releases the transportation indicators and updates more than 90 transportation databases. In October, we reported that the cost to industry of providing water transportation services increased 11 percent from September of the previous year, which I think is quite striking to think of all the economic consequences of it.

In 10 years, BTS has accomplished a great deal. Even during my three years as director, we have moved forward in many initiatives and many of these have been to improve the quality of data for our marine transportation system. One of our most exciting advances took place in May when we unveiled one-stop

shopping for transportation data through the Intermodal Transportation Database. In the near future, we will have close to 100 databases available for downloading, whether directly from the BTS site, or through links to other sites. In fact, if you call the first version Version 1, we are sort of in the decimal places now. In January, we will have Version 2 and we are putting a lot of effort into it. The whole idea is that if data are easy to find, more people will use it. If the full data set is available, then more people will analyze it and we will get more understanding from it. Ultimately any transportation data will be in this one database portal, however it is configured. Right now we see it as basically a database.

At present, you can go there and you find a fair amount of data on Maritime Administration's activities and the U.S. Coast Guard data. You will find information on vessel casualties, vessel entrances and clearances, and you will find links to other websites like the Army Corps of Engineers, which also has a lot of very good data. There will be more in the near future. We are trying to get domestic and international vessel data to link with various trade data. Our goal is to make the data easy to get and the hope is that if it is easy to get, more people will analyze it and as more people analyze it, we will learn more from it and we will all do a lot better.

The international trade database (ITDB) typifies BTS' role of cutting across modal distinctions to improve data quality comparability and dissemination. We know there is more to do to improve the quality of maritime data and with better information, decision-makers will be able to focus their efforts on solutions that have the best chance of success. We want to improve the data by partnering with everyone involved in the marine transportation systems. The whole thrust of what we plan to do is to work with others. Even if BTS could do it alone, we should not. We need to do all of these things together.

I mentioned that we are moving to upgrade existing data quality, fill data gaps and develop methods to make better use of data. We sponsor the maritime data group where BTS joins five other federal agencies to review and coordinate maritime data related activities. The group is updating maritime trade and transportation '99, a comprehensive analytical work on maritime trade and transportation in the U.S. The update will include new sections on the St. Lawrence Seaway and on maritime transportation and the environment.

We are also expanding the maritime use of our geographic information systems (GIS) capability. We are in charge of the transportation layer for the national GIS system. We are working with MARAD to develop a program to analyze the maritime trade patterns of Honduras and Nicaragua. We plan to begin using the system in Central America in December and to have it ready for use in this country by spring 2002. Our mapping capability will enable us to better analyze and improve the understanding of maritime cargo trade patterns. By matching capacity with utilization, this too can help with future investment decisions.

Another activity, not directly related, but also of importance and interest to this

group is something that we're just beginning to develop. We're going to call it the AFS, which originally referred to the "Ambitious Freight Survey", but is now the American Freight Survey, now that we are a little more modest. It is a survey of freight and, in general, the challenge we face is designing a freight data system that will be the most useful there is. I would like this to be a fairly frequent survey with a great deal of geographical detail, wide coverage and also able to measure performance, for example, how long does it take to go from true point of origin to ship. I would invite this group to work with us in designing this system so that the data are of the greatest value for everyone in this group.

BTS is also engaged in a major effort to identify data gaps. We could use help on that from the marine community. We are collecting information on gaps in transportation data that keep the transportation community from making the best informed decisions. For example, we have no database on cargo theft at seaports. This is being looked at by a number of people, but we need to do something with it. We don't have good origin and destination and route data for freight, and hopefully the freight project I just mentioned can handle it. We don't have integrated data on routes, content and quantity of hazmat shipments. Again, the American Freight Survey I hope will be able to handle it. In addition, there are many gaps about the movement of passengers on ferries and cruise ships.

If you think about it, if a gap is acknowledged, then in a sense it ceases to be a gap. Finding gaps is a difficult task, because basically you may be trying to determine what you didn't think about before and that is very difficult. This is one area where BTS particularly needs your help and that is one of the challenges I'm going to push you on – to work with us and tell us what data are needed or desired but not being gathered.

Many times I think we may not notice phenomenon simply because we have no information on it, or not enough information on it. We need to think about what information we need and maybe that will trigger the activities to fill those gaps. You can join the data gap project through our website at www.bts.gov. Tell us about data gaps you think we should be filling. Tell us how we should fill them. Tell us why we should do it and how it fits into a broader picture. We will try to take it from there and involve you as we go forward. The final report on data gaps is due in the spring of 2002 and it is essential to ensure that maritime issues are covered.

I also ask you to consider how BTS can join with the maritime community to support maritime-related intelligent transportation systems research. I thought the maritime industry was quite far ahead in intelligent transportation systems (although ITS is largely a "surface" term); for example, my impression has been that the maritime industry has been using GPS a lot longer than the surface modes.

There is a need for many standard measures for investment decisions. Because of BTS' unique data role in the transportation community, we can help with the creation of ITS data standards. We bring a national perspective to the

table, along with our expertise in data. I hope in the coming days and weeks to discuss BTS' role in ITS data and research with the maritime community. As in all our efforts, it must be a partnership. By working together, we will produce higher quality data that can lead to a safer, more secure, and more productive transportation system.

Data are the light of an enlightened policy. As we fulfill this mission, we are affecting our transportation policies and making transportation better, improving our lives and future generations. Taken together, this is an ambitious undertaking. But, as that great Chicagoan, Daniel Burnham said (and I believe every word that he said): "Make no little plans. They have no magic to stir men's blood and probably themselves will not be realized. Make big plans, aim high in hope and walk." I think we need to aim high and let's see how far we can take these ideas. Thank you.

"Linking the Pieces: Developing an Integrated and Secure North American Freight Transport System"

Harry Caldwell
Chief of Freight Policy, Federal Highway Administration

Congratulations to the people who put together this conference. This is a great collaboration among research and development interest groups for the MTS, including those who are interested in the development of SEA-21 and those of us who are more directly concerned with surface transportation issues, and the reauthorization of TEA-21. I'm going to talk today about some technical issues, but then segue into broader policy considerations on finance and program options as we move into reauthorization.

By way of background, we created a freight office in the Federal Highway Administration in January 2000 as part of our headquarters restructuring. It is the first time in the history of the Federal Highway Administration, dating back to 1917, that there has actually been an office set up to advocate on behalf of freight. It is also the first time any mission statement within the FHWA organizational structure has, as its operative verb, "advocate". That is our job – to advocate on behalf of freight interests and that is what we do.

It has been a productive working relationship in DOT. We function as a one DOT organization, and are proud to be able to work with MARAD, the US Coast Guard, FAA, FRA, the Federal Motor Carrier Safety Administration, and the Secretary's Office of Intermodalism.

This cycle of reauthorization is going to be a challenge. TEA-21 was a 40 percent increase over ISTEA authorization levels, and there is some concern that with competing demands on the Federal budget and the increasing focus on national security, the question is – are we going to have that amount of discretionary budget capability as part of reauthorization?

Our needs are great in all modes of transportation – the MTS as well as highways and rail -- and our story is a very important one to share with Congress. I'm going to focus on two

challenges – one technical and one more policy-oriented, as we work to tell the story of freight mobility more effectively in the halls of Congress, as well as in Ottawa and Mexico City, our NAFTA trading partners.

This is a slide that many of you have seen before. This is a picture of tremendous success. The U.S. freight transportation system is a multi-modal system providing ready access and superior service to most shippers delivering goods in a cost-effective and environmentally sensitive manner. As the slide illustrates, logistics as a share of GDP has declined steadily since the early 1980's, with the Staggers Act and some of the other deregulation efforts that began about that time.

In a recent article, the Journal of Commerce estimates that this reduction in logistics expenditures has saved the average American household roughly $1,000 a year since the early 80's. Every unnecessary dollar squeezed out of logistics cost is an additional dollar for upgrading plant equipment, for worker training and re-training, for basic and applied research and development, and increased equity share value for companies. Our concern is that this percentage bottomed out at about 9.9 percent two years ago, and has been inching steadily upward since then. It now stands at about 10.3 percent. The system is showing signs of strain, and it is being felt by all the modes of freight transport.

All modes of transportation are important in the U.S. economy. Trucking dominates, if you look at both domestic and international trade. If you look at international trade only, waterborne commerce dominates. Waterborne commerce, as you well know, is an important component of both international and domestic movement. It services 41 states, reaching 90 percent of the U.S. population with waterborne transportation. It carried over 1.1 billion short tons of cargo, 23 percent of ton miles of all domestic service traffic, and it contributes significantly to GDP.

I'm going to show you some images now that are part of what we call the Freight Analysis Framework. These images are all available on CD and I'll tell you how to get one at the end of this presentation. We cannot post these images on our Website for security reasons. But, if you will send me a message through e-mail, we will be happy to put a copy of this in the mail to you.

This shows domestic waterborne commerce, not only coastal shipping but the Gulf and Ohio River systems as well. This is just one state – Louisiana – domestic water flows. We have graphics like this for all 50 states prepared for 1998.

If you look at international cargo, you can see the importance of coastal shipping, which is what this panel will address this morning. Coastal shipping on both the west and the east coast and the inland waterway system is an important option for intermodal freight, particularly in some of the congested ports of entry that are going to become more congested if you consider the trade forecasts.

This is an example of international freight moving into and out of the Port

of Charleston. It illustrates the relationship of water transportation connecting to the inland gathering and distribution system of highways and railroads. This happens to be the Port of Jacksonville. Again, this kind of imagery is all contained on the CD-ROM. We've mapped the largest international ports of entry rail flows, as well as highway flows. We've mapped the 30 largest BEA regions, all 50 states, and we're working on air freight facilities right now. All of that should be completed within the next two weeks – right after the Thanksgiving holiday.

Gateways are a critical interest in the United States economy. They connect the U.S. to our NAFTA trade partners and to the rest of the world. They are critical to the future viability and functionality of the intermodal freight system. Our ability to map these things is an essential building block for a comprehensive analytical system to better understand the system, its interrelationships and investment options. We are now working with Canada and Mexico to extend this capability throughout North America. This capability will allow us to graphically illustrate the importance of gateways and long distance trade corridors, and will also allow us to engage in transport development discussions more fully with our NAFTA partners than we have had the opportunity to in the past. This comprehensive data and analytical capability is the technical challenge that I will discuss today – building a multi-modal investment performance system and a strategic planning analysis network to inform decision-makers at all levels.

By the way, gateways will likely be one of the major program areas that we will emphasize in reauthorization because of tremendous population growth as well as the trade growth that are going to impact our gateways. Gateways tend to be a free rider problem, as an economist would describe it. The costs of international trade are borne locally, but the benefits are widely distributed throughout the country of North America. It makes it problematic to invest in gateways because of this distribution of benefits and costs. But, there are ways we can address that.

This schematic diagram is a wonderful illustration for governors and state DOT officials. This slide compares the value of a specific sector of international trade – not all trade. This is the merchandise sector, but it illustrates very well the rapid growth and importance of trade in the U.S. and world commerce. The U.S. has traditionally not been an international trading nation, but as you can see from the green bars, we have dramatically increased from 1970 to 1997. If you look at our trade forecasts produced by WEFA (the Wharton Econometric Forecasting Group), U.S. trade as a share of GDP is expected to increase to as much as 35 percent by the year 2020, and a great deal of that will be waterborne commerce.

Globalization is a theme that concerns many groups concerned with labor issues, environmental issues, and cultural issues. But globalization is a phenomenon that is likely to continue. The market demands it and trade provides economic opportunities that would simply be absent without globalization. Our ability to understand the transportation implications of

globalization and sourcing changes, and our ability to explain these changes and their applications to decision-makers is absolutely critical. Currently, we do not have the tools to do this, and we need to develop them.

I mentioned our WEFA forecast – WEFA looks at rest of world, looks at NAFTA, looks at domestic freight and comes up with trade forecasts for 2010 and 2020. As you can see, cumulative we are expecting about a doubling in trade flow between now and 2020, with a disproportionate increase in international trade.

This graphic always gives state DOT directors cause for concern. This is the delta, or change, between 1998 and 2020 for commercial truck traffic – not including rail and waterway. Look at that degree of density. This is particularly interesting to waterborne interest groups. This is overseas inland trade, truck traffic coming in through our major ports. Look at the major corridors illustrated by a graphic like this. In our trade with Canada, the largest crossing between the U.S. and Canada is the Ambassador Bridge in Detroit. It carries more trade value than the entire U.S./Mexican border.

The most highly congested highway in North America is the 401 in Ontario, the trade corridor between Toronto and Detroit and extending over to Chicago. It carries 400,000 vehicles per day and is the most significant trade corridor in the entire world. The trading relationship between Ontario and Michigan is the largest trading relationship by value of any two political jurisdictions in the world.

Canada trades with the U.S. 39 times more than it does with Japan, its second largest trading partner. September 11th has resulted in a tremendous hit on the Canadian economy. Trucking has rebounded, but companies are changing their sourcing patterns, JIT levels, and holding more inventory in anticipation of potential future disruptions. Auto traffic across the U.S./Canadian border since September 11th is down 35 percent. Developing an analytical system to assess options for facilitating trade across the board, while providing for national security, is another essential element of an analytical process that we will talk about today.

This is U.S./Mexico truck traffic on the U.S. network in the year 2020. Mexico is our number two trading partner. Free trade in the Americas will further spur Latin American trade and growth in traffic. For both Mexico and the areas typically noted in a discussion of a Free Trade of the Americas area, the Gulf ports are extremely important components in supporting that growth. SASHTO (the Southeastern Association of State Highway and Transportation Officials), recently completed phase one of what is called the LATTS study (Latin American Trade & Transportation. The study assesses the Gulf ports and the Florida ports, looking at their capacity for accommodating expected Latin American trade.

The network is dense and well developed, but it is showing signs of stress. Between 1978 and 1990, the ratio of highway travel demand to new lane miles of capacity on our highway system was about 12 to 1. As a result, we are seeing increasing traffic density in are sizes of cities, particularly larger

urbanized areas, and particularly on highway types of highway, our limited access facilities. Rails cannot cover their cost of capital, resulting in branch line abandonments and rail mergers. Rails reinvest about 20 percent of after-tax revenues, compared to about 5 percent as the nation's average. They are doing a good job of trying to maintain plant and equipment, but they simply are not obtaining enough revenues to cover their cost of capital.

Regarding ports, NAFTA trade is increasing and there is a lot stress on border crossings. There are very poor intermodal connections. We completed an assessment of the National Highway System freight connectors in December 2000. The port connectors across the board show pavement conditions that are roughly twice as bad on the rest of the NHS. Most of those connectors are located in older, mixed-up industrial areas and port complexes and carry primarily truck traffic, with little non-commercial traffic.

There is a lack of interoperability across modes and, among the NAFTA partners, EDI systems are stovepiped. The U.S. just reached an agreement with Canada and Mexico to develop a tri-national ITS freight architecture to help overcome this problem. As a result of the events of September 11th, trade facilitation is now pitted against national security. If you just look at one of the port gateways, the San Pedro ports of Los Angeles and Long Beach, they expect to see a quadrupling of freight flow by the year 2020 and over that same timeframe and geographic area, they expect to add a population component equivalent to three cities the size of Chicago. The challenges of moving that much freight in a highly congested and environmentally sensitive region will be enormous.

How are we dealing with these stresses? Well, not very well. Freight and intermodalism are tough for the federal 3-C transportation planning process, which has been in place since the mid-1960s. It is a wonderful planning process for developing systems. It is not a very good planning process for responding to operational changes and shorter range decision making. The time horizon differential between the public and private sector is something we will address in reauthorization.

We talk a lot about intermodalism, but we don't provide the technical assistance to the states and MPOs. It is very tough to get intermodal funding for projects involving waterways or rails out of the highway trust fund. We have made some inroads in that direction, through redefinition and interpretation of eligibility, and we will continue to make some more. Part of the reason is that we don't have the ability to think or analyze beyond our modal stovepipes. We tell the states and the MPOs to think and act intermodally, but we give them very little direction on how to do that. We won't be able to chart an effective intermodal course to the future until we can define what we have – how well is the intermodal system performing? We need to be able to define the relationship between past and future investments in performance, and be able to tell Congress…. you gave us money and this is what we did with the money, and this is how the performance changed. We need to be able to relate investment to transport performance and transport performance to national well-being.

I've dealt with Office of Management and Budget and have good friends over there, and the OMB has been focused on balancing the budget throughout the entire decade of the 90's. It is very difficult for them to differentiate between current spending and investment strategies. To them, a dollar is a dollar. Occasionally, our role at DOT in supporting economic growth and trade and productivity is questioned. I expect it is hard for people in this room to believe, but that is the point of view of some members of the budget community. An expanded ability to relate our budgets to national economic wellbeing is essential as we work cooperatively to compete for limited public resources. We have been working in that direction for some time within the highway community, and the marine community is investigating how to do the same on the waterside. That is a tremendous step in the right direction.

Second, we need to define the necessary coordination of parallel initiatives with trade facilitation and national security. It is one thing to build infrastructure to our ports and to our border crossings, but if it is not well coordinated with Customs and GSA and INS and the other trade facilitation agencies, then we have simply substituted one roadblock for another. More specifically, we need to be prepared to describe the performance characteristics and their changes, not by mode, but across the entire system. This is something the European Union is working on with some success.

We have to be prepared to describe the relationship between public and private capital and operating investment and system performance by mode and across mode. That is what an investment performance system is all about. To do that, we need to begin developing – and this is my challenge for you today – a multi-modal investment performance system to help understand and address these questions.

This is an example of the beginnings of an investment performance system, looking at the highway system. I showed you the demand maps. This is an overlay of demand with capacity. This shows the highway segments that have traffic volumes greater than 100,000 vehicles per day, and truck volumes greater than 10,000 vehicles per day. Having this kind of capability allows one to map demand against capacity, define potential choke points, begin to look at intermodal rail and water options to mitigate these problems, assess the benefit cost of alternative actions, and then coordinate the development of multi-jurisdictional approaches to program improvements in a logical and consistent manner.

A multi-modal investment performance system (MMIPS) can find not only where existing problems are, but where problems might be developing. VSF is volume to service flow. It is the old V/C ratio that some of you may be familiar with. A VSF of greater than one theoretically is at capacity. A VSF of 0.8 to 1.0 is like a shadow on your x-rays when you go to the doctor. It is a problem that is developing and we need to begin worrying about it. The reason is that increasingly a lot of U.S. trade is high value-added – it is very time-sensitive trade. When you get to a VSF of .8 to 1.0, system reliability begins to diminish dramatically. When you don't have good system reliability, shippers

have to hold more inventory as a buffer against a system breakdown.

Detroit, Michigan and Windsor, Ontario are the home of the U.S./Canadian auto industry. A lot of parts shipments go back and forth across the border into assembly plants of the "Big Three". One of the "Big Three" charges drayage operators crossing the border $5,000 per minute for delay – each truck, $5,000 per minute. That is the degree of reliability that is expected from their supporting transportation system. MMIPS can allow you to begin relating changes in your system performance to what you need.

Today's technical challenge is to establish the need or framework for an integrated North American freight data and analytical capability. We need to begin thinking through the pieces that we need to link together or begin developing, that will allow us to move toward the concept of a multi-modal investment performance system. The ICMTS is moving in that direction. They are actually letting a statement of work to develop a needs capability for the maritime industry. That is a huge step in the right direction.

There is a group called MAROPS – the Mid-Atlantic Rail Operations program, which involves CSX, Norfolk Southern and Amtrak, with several state DOTs. It is a wonderful partnership looking at identifying choke points in the Mid-Atlantic area for rail. We are beginning to think through how the railroads could provide an information system that would allow them and us, in cooperation, to define those choke points and investment options and trade-offs. This is a big step for the railroads since they are privately owned.

FHWA and the Federal Transit Administration had been moving in this direction for several years with the combined Conditions and Performance Report. There is a group set up by U.S. Customs called the Border Station Partnership Council, which includes all the Federal Inspection Services, FHWA, and Federal Motor Carrier Safety Administration. That group is sponsoring the development of Border Wizard, which allows us to look at the relationship between transportation connections in port of entry operations. We currently have an operating model that can be used to simulate movement at land crossings with Mexico and Canada. We are just now beginning to develop a Canadian version of this. By the end of 2001, we will have the capability at three locations – Blaine on the Pac Highway between Washington and British Columbia, Champlain on I-87 south from Montreal, and Ambassador Bridge in Detroit – to display a port of entry showing the current customs and immigration practices and procedures of the U.S. going northbound and Canada coming southbound. We will have an integrated tool that enables those federal inspection services on both sides of the border and the transportation agencies that build and operate the infrastructure connecting the port of entry, to look at investment strategies, operating strategies, and personnel strategies to improve that port of entry. It would not take much to adapt that to a marine environment. Then we would begin having a true multi-modal investment performance strategy.

System analysis isn't only about modal and intermodal investment. Given a trade corridor, a system like this can help define which corridors and gateways are most critical and are of most regional and national significance. It can help you talk about what is the most effective modal balance. It can help you talk about what sort of trade facilitation facilities need to be provided for Customs, trade, security, cargo and passenger inspection and clearance. When I talked to RADM Bob North (USCG) about this last year, he immediately understood how this would enable him to calculate resource requirements for each port of entry, cutters, aids to navigation, so on. You would be able to define the magnitude of demand at a port of entry and translate that demand into support services – whether it is personnel, aids to navigation, dredging, you name it. All that capability could be built into this.

Other building blocks include the highway marginal benefit cost procedure that we use to estimate needs for U.S. Congress. I mentioned that MARAD and Coast Guard are now letting a contract to look at an investment performance system for waterways. I also want to mention that the Mexican Transport Institute, with whom we met in Brownsville in September to talk about the development of this capability between the U.S. and Mexico. Mexico has an enormous analytical capacity that we have not yet accessed, including land, rail and water. Last week I was in Toronto talking to the Canadians about the same thing.

On the policy side, there are also tools that can help us understand the problem that we face in the future.

Understanding the problem can help us define the strategy. The strategy can help us define the program needs. The program needs can be conveyed through common message sets. Then the message sets can be orchestrated to convey consistency, comprehensiveness and coordination to the U.S. Congress – a very persuasive method.

The other challenge I would like to leave with you today is policy coordination. I believe we must coordinate message development for freight productivity and national security. In all cases, our legitimate needs by any modal definition exceed available revenues. Cannibalizing one mode, pitting one against another, or borrowing from Peter to pay Paul simply won't get the job done. We need to go to Congress in tandem, in a cooperative arrangement, to offer options and solutions, not simply a litany of problems. I think it is important for us to develop common message sets for all modes and all interest groups. We have talked in terms of single modes for too long. We have talked about the highway mode. We have talked about the water mode and all the other individual modes. With budget constraints and widespread needs and a Congress faced with competing demands and pervasive national concern for safety and security, we can no longer afford to talk about individual modes in isolation. We must talk about how we can use all of our skills and national resources to meet the challenges of trade and security across the entire transportation system.

In summary, we need a comprehensive data analysis system, a multi-modal investment performance system linked to related transportation support tools, and a strategic planning analysis network

that will allow us to begin thinking intermodally. With these tools, we can develop common message sets to deliver a coordinated and comprehensive message. Intermodal trade transport is an investment in the nation's future, and essential for economic growth and continental security.

Something I keep in mind all the time is that "leaders do the right thing; managers do the thing right". We need both – those who can point the way and those who can plot the course. This group is key in helping make that happen. Thank you.

IV. TECHNICAL SESSIONS

SESSION 1 – FUTURE FLEET PREDICTIVE CAPABILITY

CHAIR
Mark Pointon, U.S. Army Corps of Engineers, Institute for Water Resources

Ian Mathis, U.S. Army Corps of Engineers, Institute for Water Resources

COORDINATOR
Phillip Thorpe, U.S. Army Corps of Engineers, Institute for Water Resources

TITLE OF PRESENTATIONS AND SPEAKERS
"International Trade Forecasting" by Robert West, DRI-WEFA

"Future Fleet Predictive Capability: NDNS Fleet Forecast Update" by Michael Sclar, Michael L. Sclar Associates, Inc.

"Future U.S. Vessel Constraints" by Phillip Thorpe, U.S. Army Corps of Engineers

SUMMARY
International Trade Forecasting.
In his presentation, Mr. Robert West emphasized the importance of understanding cargo movements in order to predict fleet demand. His organization developed a unique data set covering bilateral, global trade defined by 54 countries and 16 regions. He reviewed several charts which project the annual growth of total container trade and sea borne imports by coast, until the year 2020. He also provided information on gulf exports and top ten exported goods for 2001.

Future Fleet Predictive Capability: NDNS Fleet Forecast Update
Mr. Michael Sclar provided an informative presentation on the latest NDNS fleet forecast, an update of the 1996-based system using a year 2000 base which identifies historical trends and provides a current capability for predicting future fleets and port and terminal requirements. Its objective is to develop a forecast of trade and vessel calls by vessel type and size by port, trade partner region, and commodity to support port project planning and evaluation. Mr. Sclar discussed the fleet forecast procedures, data sources, and database dimensions. He also provided sample analyses, showing charts from years 2000 through 2050 with data such as total exports and imports; exports by region; and import container tons.

Future U.S. Vessel Constraints
Mr. Phillip Thorpe started his presentation by outlining the objectives and accomplishments of the National Dredging Needs Study, which provided an assessment of the future national waterside infrastructure needs. He then displayed several charts to show the tonnage and value of U.S. trade by world region and coast; distribution of dry bulk and containership vessels; forecast of annual vessel calls on various coasts; and the constrained vessel calls with and without Corps projects. International trade is expected to grow by 4-5 percent annually – this growth will cause increased congestion and industry consolidation. Industry consolidation will result in larger vessels and traffic consolidation (hub ports), requiring

deeper channels and increased port capacity.

SESSION 2 – NAVIGATION AND INFORMATION SYSTEMS 1

CHAIR
Rudy Peschel, Saab Transponder Tech

COORDINATOR
Athar Pirzada, U.S. Coast Guard

TITLE OF PRESENTATIONS AND SPEAKERS
"Development and Implementation of Coastal AIS Network Concepts, with MTS Implications" by Magnus Nyberg, Saab Transponder Tech

"Intelligent Waterway Systems (IWS)" by Jay Spalding, U.S. Coast Guard

"The United States ENC Program of the Coast Survey" by Mike Brown, National Ocean Service, NOAA

"Prospect for PORTS" by Kathryn Bosley and Mark Bushnel, National Ocean Service, NOAA

"Linking Risk Assessment of Marine Operations to Safety Management in Ports" by Vladimir Trbojevic, EQE International Ltd.

SUMMARY
This first session of Navigation Information Systems introduced a combination of proven and burgeoning technologies that offer disparate collection opportunities, but insufficient in number and scope to provide integrated solutions. Each, however shows advancement and greater potential to gather data for user exploitation and exchange, thereby contributing to the safety and productivity benefits of systematic marine transportation as a mode. Risk management was introduced as a means of significant improvement to MTS performance, with a need for input data from a greater variety and scope of sources than the Information Systems as presented, further pointing the need for comprehensive strategic planning that would enhance component development, and therefore synergy.

<u>Development and Implementation of Coastal AIS Network Concepts, with MTS Implications</u>
Marcus Nyberg's presentation addressed shore based AIS network implementations and, as an example, showed the implementations in the Baltic Sea area. It has long been realized that an automatic reporting device (transponder) fitted on a ship/airplane (mobile station), could be beneficial to the safety of navigation and the control and monitoring of the maritime environment. An automatic reporting system called the Automatic Identification System (AIS) has been adopted by IMO as carriage requirement for ship sailing under the SOLAS regulations. Domestic requirements for other vessels such as tugs, fishing vessels, pilot boats, etc. will be seen on several places worldwide. In order to use the AIS functionality in a broader range for shore applications, a shore-based infrastructure has to be established. A shore-based network solution has a great deal to offer various groups of users such as maritime authorities, port authorities, and shipping offices. The AIS eases the communications workload on all parties due to automatic and continuous transmission of ships position, static, and voyage-related data and by providing means to send/receive text and binary messages. Operators and watch keeping officers can focus on operational and

logistical issues. The digital data link for ship-to-shore and shore-to-ship enables real-time monitoring and messaging between mobile stations and shore applications. The shore-based network infrastructure enables distribution of information in a very cost effective manner to mobile stations moving in coastal areas, by using the functionality of the AIS-transponder system. This information can consist of re-broadcast of position reports, navigational data, weather reports, real-time hydrographical data, DGNSS corrections, and port information. The authorities could also, by means of the shore infrastructure, provide fleet and port management services to shipping and transportation agencies by using the precise information existing in the system. In order to better perform these activities efficiently over a broader area, a shore-based infrastructure must exist which can take care of the communications needs between shore and ship-based users. Since 1998, Saab TransponderTech (STT) has developed solutions for a shore-based network that meets the various demands for a network infrastructure consisting of multiple shore users.

Intelligent Waterway System

Various MTS users and stakeholders recognize the need for improvement in information transfer. Because of the diversity of MTS interests, the quick fixes that result are often extremely limited in the type of information transferred, and generally have a specific information provider-information user channel. This "stovepipe" effect is often unnecessarily duplicated. The concept of an Intelligent Waterway System (IWS) is one where information transfer becomes more efficient, accurate, and timely. Recent studies have concluded that development of an IWS for the United States is necessary to keep pace with the continuing growth in the amount of waterborne commerce seen over the past decade and forecast for the future. The U.S. Coast Guard has begun a research effort to improve the efficiency and effectiveness of maritime related functions through the application of information technology. This is being done through the efforts of several projects including automatic identification systems and augmented reality for navigation, as well as interagency efforts.

We propose a network approach, taking advantage of existing Internet technology. To achieve the desired result, we expect to use a Peer-to-peer methodology of distributed content rather than an "information hub." Existing technology allows for content security and limited distribution where necessary to protect sensitive information. A new, content-based mark-up language will be the basis for information transfer and transfer protocol.

The U.S. ENC Program of the Coast Survey

The Office of Coast Survey (OCS), National Ocean Service (NOS) of the United States National Oceanic and Atmospheric Administration (NOAA) is creating a database of digital vector chart data for the production of Electronic Navigational Charts (ENC). Mike Brown's presentation described the ENC program in detail and reviewed the project's status to date. In doing so, he noted that the ENCs will be in the International Hydrographic Organization (IHO) format as defined in Edition 3.0 of

Publication S-57: IHO Transfer Standard for Digital Hydrographic Data. To provide ENC data to mariners and other users in a timely manner, NOS will produce ENCs for the 40 major commercial ports and for private sector companies to use in custom products and services. ENC data will be compiled from original source materials where appropriate to provide the most accurate data available. The ENC database will be kept in continual maintenance (i.e., up to date on a weekly basis), allowing ENC users to obtain vector data sets that contain the most current and accurate information.

Prospect for PORTS

Kathryn Bosley gave a presentation on the Physical Oceanographic Real-Time System (PORTS™), a program of NOS's Center for Operational Oceanographic Products and Services (CO-OPS) that supports safe and efficient navigation by providing ship masters and pilots with accurate, real-time information required to avoid groundings and collisions while, at the same time, maximizing waterway throughput. Beginning in 1991 with the installation of a prototype in Tampa Bay, PORTS™ has developed into a national network. PORTS™ comes in a variety of sizes and configurations, each specifically designed to meet user requirements and to take into account geographic and hydrologic differences between waterways. Today in addition to Tampa Bay, New York/New Jersey Harbor, San Francisco Bay, Houston/Galveston Bay, Narragansett Bay, Los Angeles-Long Beach Harbor, Soo Locks, and Chesapeake Bay are home to full scale operational PORTS™. PORTS™ is a partnership based on extensive collaboration between NOS and local maritime communities to identify and satisfy user needs. Pursuant to congressional direction, CO-OPS oversees the implementation, operation, and maintenance of these systems that are funded by local user organizations.

Linking Risk Assessment of Marine Operations to Safety Management in Ports

Vladimir Trbojevic proposed an approach for developing Integrated Safety Management Systems (ISMS) for managing navigation and other marine operations in ports. The methodology requires that all risks are identified and evaluated, that suitable controls are in place to manage these risks, and that the linkage between risk controls, operating procedures, harbor by-laws, and the management activities is explicitly established. This methodology has been applied to a number of ports in the United Kingdom in compliance with the Port Marine Safety Code requirement. Mr. Trbojevic also discussed an extension of the methodology towards assessing focus and robustness of the ISMS, as well as some ideas about ISMS safety ratings.

SESSION 3 – REGIONAL SEDIMENT MANAGEMENT I

CHAIR
Barry W. Holliday, U.S. Army Corps of Engineers

COORDINATOR
William McAnally, U.S. Army Corps of Engineers

TITLE OF PRESENTATIONS AND SPEAKERS
"The Corps' Regional Sediment Management Research Program" by William McAnally, U.S. Army Corps of Engineers

"Regional Management – Ports Perspective" by Richard Gorini, J. Simmons Group

"RSM Experience and Issues – Vicinity Ponce de Leon Inlet, Florida" by R. Bruce Taylor, Taylor Engineering

"Fine Sediment Dynamics at a Regional Scale" by Ashish Mehta, University of Florida

"Support for Decision Making in Evaluating Proposed Dredging Projects" by Simeon Hahn, Mary Matta, and Alyce Fritz; National Ocean Service, NOAA

SUMMARY
This session highlighted research and technology for improving the MTS by managing sediment resources flowing into and through the navigation system's channels, locks, and harbors. In doing so, it sought to:

- Identify present understanding of managing sediment on a regional scale.
- Identify gaps in research and technology that are needed for effective operation and maintenance of the MTS.
- Foster partnerships between agencies and organizations engaged in understanding and managing sediment resources.

Topics presented at this session include an overview of the Corps's RSM research and development program; technical innovations and tools for better sediment management; and case histories of success stories in beneficial use. Speakers represented a diverse set of interests and organizations, including the private sector and academia.

<u>The Corps' Regional Sediment Management Research Program</u>
Many water resource projects are designed and operated to remedy local sediment problems, sometimes at the expense of creating even larger problems some distance away. Successful project design and operation requires that sediment issues be resolved at both local and regional levels, yet resource managers lack the information and tools needed to make informed decisions. These challenges adversely affect navigation; flood and storm damage reduction efforts; and environmental quality in water resource projects. The U.S. MTS Task Force provided a national vision for MTS 2020, recommending R&D on overall effective sediment management which includes

"holistic watershed and local/regional planning efforts." To meet this vision, a Regional Sediment Management Program is currently being developed to (a) provide knowledge and tools needed for holistic regional sediment management within USACE water resource projects to achieve economic and environmental sustainability, and (b) enable project planning, design, construction, operation, and maintenance that will minimize disruption of natural sediment pathways, or mediate natural processes that have adverse environmental or economic impacts.

Regional Management – Ports Perspective

Richard Gorini serves as Executive Vice President of the J. Simmons Group, a project management consulting firm for the Port of Houston. In his presentation, he showed how dredged material is a resource. Beneficial uses of dredged material were a key element in the Houston Ship Channel deepening project. During the planning stage, an Interagency Coordination Team (ICT) was formed with a top-down commitment to bottom-up solutions. The ICT had twelve members from federal agencies, Texas state agencies, and the Ports of Houston and Galveston. A subgroup, the Beneficial Uses Group, worked to develop a utilization plan for the dredged material. In doing so, they carefully considered the potential environmental, economic, and engineering impacts associated with using dredged materials. They also conducted an outreach to the community, asking how to best improve the project. The end result was a Disposal Area Management Plan that provides a capacity for handling expected dredged material for the next 50 years.

RSM Experience and Issues – Vicinity Ponce de Leon Inlet, Florida

R. Bruce Taylor's presentation addressed three separate programs with inherent yet related sediment management requirements that impact national, regional, and local public interests. The programs include two federally authorized navigation projects, the Intracoastal Waterway (St. Johns Harbor to Miami) and the Ponce De Leon Inlet Navigation project, as well as the State of Florida's Beach Management Program. Initiatives to effect sound regional sediment management for all of these projects has revealed competing project requirements and conflicting federal, state, and local interests.

Dr. Taylor discussed the problems encountered, solutions considered, and actions taken. He outlined several impacts and payoffs for these programs: accomplishment of multiple project/program objectives, the establishment of community support, and the implementation of effective regional sediment management encompassing multiple programs.

Fine Sediment Dynamics at a Regional Scale

Regional examinations of fine sediment transport related problems require development of regional sediment budgets and meso-scale modeling approaches. Delineation of boundaries for sediment budget is easier for the estuarine environment in comparison with the open coast, where the offshore boundary is especially difficult to establish. As a result, our present ability

to model open coast transport of fine sediment is rudimentary. The Loxahatchee River estuary on the east coast of Florida receives sand from the littoral system and fine-grained material from the river tributaries. In order to deal with the problem of excessive sedimentation in the central bay of this estuary, both sand and fine sediment budgets have been developed on a preliminary basis. Through careful suspended sediment flux measurements and bed load trap measurements it is proposed to refine the budgets for an assessment of future needs to manage sedimentation in the central bay. Along the open coast, it appears possible to use known formulations for cross-shore and alongshore fine sediment fluxes to model shoreline changes due to wave action. Comparison between measured changes and diagnostic simulations indicate qualitative agreement; for quantitative prediction considerable additional field data and model development are required.

Support for Decision Making in Evaluating Proposed Dredging Projects

NOAA recently completed an effort to assist the State of Delaware in developing guidance to evaluate proposed dredging projects. The Delaware Statewide Dredging Policy Framework manual covers all aspects of the decision-making process, including economic benefits, potential environmental impacts of the dredging, disposal options, and the potential for beneficial reuses and habitat restoration. The manual was developed in cooperation with the private sector, industry, federal and state agencies, environmental groups, and citizens. The guidance is intended to support evaluations of environmental impacts in support of dredging decisions, and provide suggestions for project designers on modifying projects to reduce environmental impacts. A tiered framework was created to determine how to identify potential effects before dredging (whether literature information is sufficient or whether site-specific sampling would be helpful). Guidance and recommendations for evaluating impacts during dredging operations, and monitoring post-dredging are also provided. The document also provides references to other sources of information useful in the decision-making process and checklists to identify habitat and resources that might be affected.

This effort will improve decision-making in the State of Delaware and will reduce environmental impacts of dredging projects. It also serves as a useful model for other areas by providing a template for discussions with local stakeholders in port and coastal areas throughout the country.

SESSION 4 – INTERMODAL FREIGHT NETWORK SYSTEM

CHAIRS AND COORDINATORS

Robert Bouchard, Maritime Administration

Richard Walker, Maritime Administration

TITLE OF PRESENTATIONS AND SPEAKERS

"Efficient Marine-Rail Interface" by Blair Garcia, TranSystems Corporation

"Port Intermodal Distribution Network" by Bill Ellis, Port Authority of New York and New Jersey

"Inland Agile Port" by Peter Franke, Noell Crane (Germany)

"Intermodal Freight Rail" by William Goetz, CSX Lines

SUMMARY

The theme for this session was to discuss improvements to intermodal systems and networks that will provide more efficient means of cargo movement and ensure cargo security. Recent data shows that over the past three to five years a major pinch-point in the transportation system has been the port or terminal area. This is true from access or egress systems, as well as terminal operations. The session presented some innovative ideas on how to resolve the issues.

Efficient Marine-Rail Interface

The purpose for developing an efficient marine-rail interface is to improve marine terminal efficiency and intermodal terminal efficiency, and the corridors that connect these facilities. Some potential benefits of efficient marine-rail interface and a systemic approach to regional freight infrastructure include, (1) the ability to accommodate both commercial and military freight, (2) added flexibility utilizing marine and intermodal terminals, and (3) an increase in the velocity of cargo through existing transportation infrastructure. An efficient marine-rail interface is part of a larger agile port system. Agile port systems typically consist of five major components: (1) the marine terminal, (2) inland intermodal facilities, (3) freight corridors, whether they are dedicated freight corridors or existing shared use freight corridors, (4) data and information management systems, and (5) system management to tie all the pieces together. An efficient marine terminal has the capability of increasing typical throughput by as much as 100 – 200percent over existing facilities. However, to do this there needs to be an inland intermodal center to accommodate the storage, sorting and dispatching of containers from the efficient marine terminal.

Port Intermodal Distribution Network

The Port Inland Distribution Network (PIDN) focuses principally on moving containers through a port area and to the region that it serves. PIDN is a concept to move containers through the Port of New York and New Jersey (PANYNJ) and the area it serves. Today the port is served principally by truck in terms of inland distribution, with the exception of major railroads like NS and CSX. PIDN offers an alternate system for moving containers inland. Currently the PANYNJ handles about three million TEUs, with a projected 4.2 percent compound annual growth rate, which will grow to16 million TEUs in the next

40 years. Today about 86 percent of the container traffic moves through the port by truck. The idea of PIDN is to move a substantial numbers of containers inland by rail and barge, rather than by truck. It was realized that many other benefits could accrue, not just to the metropolitan area of New York but the entire larger northeast regional area. The PIDN could stimulate economic development by creation of activity at inland feeder ports where they have been de-industrialized. Also, the ability to, at feeder port locations, construct warehouses that would, in effect, be on the port. In the hub port, warehouses are being demolished to make room for container terminal capacity; yet at feeder ports, they have an opportunity to meet industry needs for warehousing on dock, and that is a significant benefit as well. And, lastly, rail and barge movement offers significant energy conservation and fuel efficiency, especially in comparison to trucks.

Inland Agile Port

On the major containerized trade routes, container shipping is growing by 6-8 percent each year. Container ports in Europe are becoming more congested and ports are trying to find a way to move more cargo via rail. Several years ago there was a government sponsored competition in Germany to develop new methods to sort intermodal rail traffic. A method to replace the existing time consuming sorting yards was being sought. A new idea was developed using shuttle cars and overhead cranes. The new facility is 80 meters wide by 700 meters long. In Europe 700 meters is the maximum length of trains. These trains arrive at the facility every eight minutes. The facility can handle up to six trains at a time. At zero time the first train arrives, after eight minutes, the second, after sixteen minutes, the third, and so on. After 40 minutes, all the trains have arrived. After 20 minutes in the facility the first train departs. Then each of the other trains leave at eight-minute intervals. Within 100 minutes all the loads can be interchanged which is about 360 containers. The system is called mega-hub and uses up to 10 overhead cranes to in parallel to sort from one train to the other. This type of system will help prevent road congestion and fits into smaller land areas than current sorting yards.

Straddle-Carrier Based X-Ray System Manufactured by Noell. This system was developed with an x-ray company called Aero-Core based in California. The U.S Customs Service uses this system at the Port of Miami where operations have been very successful. The carrier passes over the containers, one or two high, and produces a manifest of their contents -- drugs, contraband, explosives, weapons, etc. A patent also exists of an application to detect nuclear materials.

Intermodal Freight Rail

Intermodal involves the movement of trailers and containers on trains. A private sector business, the North American intermodal rail industry is primarily the province of six large Class I railroads. First, intermodal rail is a competitive business because it has no pre-ordained franchise – almost all cargo on the intermodal trains begins and ends on rubber tires (trucks). Truckers could move all the freight if rail was not competitive. Second, this is a very service-oriented business. Whoever owns the cargo is very anxious to convert it to cash. Third, the intermodal

network today is basically the same as 50 years ago. The rail network has gotten smaller as time has gone on. Finally, this is a growth business more freight can be put on rail. How is intermodal competitive advantage created? First, rail is more competitive over longer distance. Second, large train-load volume. The more containers you can put on the train, the lower the unit costs. Finally, the more concentrated the traffic distribution pattern is, the more economical and the more competitive that intermodal move will be.

SESSION 5 – LEVELS OF SERVICE

CHAIR
Patricia Mutschler, U.S. Army Corps of Engineers, Institute for Water Resources

COORDINATOR
Sandra Knight, U.S. Army Corps of Engineers

TITLE OF PRESENTATIONS AND SPEAKERS
"Highway Perspective" by Ray Derr, Federal Highway Administration

"Capacity of Inland Waterways" by David Grier, U.S. Army Corps of Engineers

"Corps LOS Perspective" by Jack Langowski, Planning and Management Consultants, Ltd.

"Port Perspective" by Greg Brubeck, Port of Corpus Christi

"Coast Guard Perspective" by Jorge Arrozyo, U.S. Coast Guard

SUMMARY
The goal of this session was to discuss how various agencies measure Levels of Service for transportation systems. The speakers included Ray Derr of the Transportation Research Board; David Grier of the U.S. Army Corps of Engineers; Jack Langowski of Planning and Management Consultants; Greg Brubeck of the Port of Corpus Christi; and Jorge Arrozyo of the U.S. Coast Guard. The speakers represented a cross-section of the transportation community to include Federal agency proponents as well as users. The session was organized and chaired by Dr. Sandra Knight and Ms. Patricia Mutschler of the U.S. Army Corps of Engineers.

Highway Perspective
Mr. Ray Derr discussed the extensive effort that has gone into the Federal Highway Administration's (FHWA) program for addressing the level of service provided for highways, transit, bicycles and pedestrians. The system used by the FHWA uses a letter ranking, from A through E, to evaluate the capacity of a roadway. A grade of "A" means that there is excess capacity and a grade of "E" means that the roadway just meets capacity. As congestion increases, the rating decreases. Congestion is measured by how crowded the road is, and the speed at which traffic can flow. For transit services, such as busses, a different metric is used. This metric measures the availability of service, the comfort of the service and the convenience of the service. For bicycles and pedestrians, congestion is measured by the number of occurrences that a single cyclist or pedestrian will encounter another user in a given hour.

Capacity of Inland Waterways
Like highways, rail and air traffic, the 12,000 miles of the Mississippi River and tributaries' inland waterways system (IWW) also experience congestion and capacity choke points that cause delays and increase transportation costs. Capacity challenges are poised to increase as commerce continues to grow, while at the same time the system is aging and becoming less reliable. Mr. David Grier discussed the current and future commodities expected on the IWW system of the United States, particularly petroleum, coal, aggregates, chemicals, and farm and food supplies. Currently, $73 billion of cargo transits

the system at an average transportation cost savings of $10.67 per ton in 31 states. The recent discussion of capacity constraints has focused on lock dimensions. Smaller locks necessitate multiple lockages for a single tow. Also, as the capitol stock ages, deterioration causes unplanned closures. In 1999 there were a total of 120,000 hours of unavailability of locks in the system. It is estimated that the system is at 75 percent capacity now and commerce is expected to grow by 33 percent by the year 2020. Without improvements to the infrastructure, growth cannot be realized. Mr. Grier discussed the existing plans to increase the IWW capacity by increasing the size and efficiency of the locks on the waterways. Each lock project costs between $200 million and $1 billion. Two of the nine most constrained locks are being replaced. He also discussed the current backlog of Corps projects awaiting construction and major rehabilitation.

Corps LOS Perspective

Dr. Jack Langowski discussed the ongoing effort by the Corps' Institute for Water Resources to develop a metric for measuring the level of service provided by the various Corps projects. Dr. Langowski traced the history of the effort from its inception with Principals and Guidelines of 1983 through the Operations and Maintenance Program Plan of Improvement of 1993, the Government Performance and Results Act of 1995, the Cost Savings Task Force of 1998, and the Operations and Maintenance Business Information Link (OMBIL) of 1999. Dr. Langowski discussed how navigation projects are evaluated on commodity projections over a projected 50 year project life to determine which project will have the highest projected net benefits and therefore be the expected National Economic Development (NED) Plan to be constructed. However, some projects, once constructed, exceed expected throughput and others fall short. One way to determine the level of service provided by a particular project would be to consistently and frequently update the feasibility analyses performed. However, this approach is time and cost limiting. Other metrics have to be measured to assure that a given project is still performing at an acceptable level to warrant continued public investment. Dr. Langowski discussed the current effort to develop a useful metric for measuring level of service. The team, lead by the Institute for Water Resources, has chosen nine characteristics to explore to develop a more holistic picture of the service provided by an ongoing project. These characteristics include the following: safety, customer requirements, economic performance, operational and physical performance, stakeholder expectations, capacity, policy and political issues, national security issues, and environmental issues. This effort is ongoing and further analysis is required for each composite component, but progress is being made.

Ports Perspective

Mr. Greg Brubeck shared with us his experience as a user of the navigation projects constructed by the Federal government. He addressed the level of service issues that needed to be addressed in the Corpus Christi Harbor. These issues included dredged material management, a narrow channel, a lack of deep water access, a channel that was not deep enough to accommodate future growth, safety concerns and vessels

delays. He spoke about an ongoing planning effort for the Corpus Christi Ship Channel that he has participated in with the Corps district in Galveston to address some of these issues. His experience has been mixed. Initially, he viewed the Corps process as being onerous, long and expensive. As a businessperson he wanted to have the new port constructed as inexpensively and quickly as possible. Through long negotiations, the Corps was able to focus the scope of their effort and streamline their study process significantly enough to meet the needs of the port community. This effort is expected to lead to a constructed project by 2010.

Coast Guard Perspective

Captain Jorge Arrozyo of the United States Coast Guard, Vessel Traffic Management Group, made a presentation addressing a decision making tool used by the Coast Guard to assess the needs and priorities of each harbor in the United States. The goal of the Port and Waterway Safety Assessment is to increase public participation and promote more public and private partnerships. The tool utilizes the Harbor Safety Committee at each port, lead by the Harbor Master, as a users group to identify the specific needs and risks at each port. To date, this process has been completed at 28 ports in the United States. The tool uses a list of questions and asks the group to rank the questions in progressive pairs. A statistical analysis is used to then order the relative rankings of the questions to gain a comprehensive view of the overall needs of the port. This can then be used to set the priorities for the harbor for future development and funding.

SESSION 6 – BALLAST WATER TREATMENT TECHNOLOGIES

CHAIR
John Heisler, Environmental Protection Agency

Dorn Carlson, National Oceanic and Atmospheric Administration

Rich Everett, U.S. Coast Guard

COORDINATOR
Craig Vogt, Environmental Protection Agency

Dorn Carlson, National Oceanic and Atmospheric Administration

TITLE OF PRESENTATIONS AND SPEAKERS
"Shipboard Ballast Water Treatment Tests" by Allegra Cangelosi, Northeast/Midwest Institute

"Ballast Water Treatment on a Cruise Ship" by George Wright, Princess Cruise Lines

"Ballast Water Treatment on MV Cape May" by David Wright, University of Maryland

"Ballast Water Treatment on the Tonsina" by Bill Stubblefield, ENSR Corporation

"Environmental Technology Verification for Ballast Water" by Ray Frederick, Environmental Protection Agency

SUMMARY
As one of its foremost environmental concerns, the MTS report to Congress identified the possible introduction of organisms of invasive species in untreated ship's ballast water. A large variety of different treatment technologies to remove, kill, or inactivate aquatic organisms in ballast have been proposed or tested at the laboratory scale, but fewer have actually been subjected to controlled experiments on ships in actual field conditions. This session was mainly devoted to reports from researchers who had conducted such ship-board experiments. In these experiments, ballast water was treated by physically removing the organisms by filtration or centrifugation, by killing the organisms with ultraviolet light or chemical biocides, and by applying several different treatments in series. Researchers reported on the results of their work, and on the special challenges faced by investigators conducting controlled experiments on a full-scale operational ship. A presentation was also made on the "Environmental Technology Verification" program, a joint EPA-Coast Guard program designed to assist vendors of ballast water technologies in rigorously testing and reporting on the effectiveness of their technologies.

SESSION 7 – ITS TECHNOLOGY AND INFORMATION

CHAIRS AND COORDINATORS

Robert Bouchard, Maritime Administration

Richard Walker, Maritime Administration

TITLE OF PRESENTATIONS AND SPEAKERS

"Regional Information Sharing Systems – Internet Based" by John Lutz, Transcentric Corporation

"Optical Scanning Technology for Marine Gate Systems" by Terry Gibson, Science Applications International Corporation

"X-Ray Technology for Container Inspections" by Vic Orphan, Science Applications International Corporation

"Freight Information Real-Time System for Transport" by Karen Tobia, Port Authority of New York and New Jersey

SUMMARY

The panel addressed and looked at how it can enhance security. Some of the technology is in place, like optical character recognition technology. In talking about technology, the most important thing is how it allows information sharing among partners who do not normally share data, which includes most competing intermodal entities.

Regional Information Sharing Systems – Internet Based

DRMEC is the Delaware River Maritime Enterprise Council (DRMEC). It is a non-profit organization, funded by the State of Pennsylvania. The DRMEC mission is to demonstrate an integrated intermodal transportation data system for Pennsylvania, for the port of Philadelphia and its corridors. This project will have a national scope because it can assist with deployment of data across the supply chain. The goal of DRMEC is to facilitate end-to-end electronic communication and tracking of goods and equipment by data capture. A data center called, Rapid Center, will allow computer systems to talk to each. The center will be able to integrate legacy systems into one common, neutral format that will serve customer needs. Rapid Center is going to be owned and developed by the State of Pennsylvania and run by a trusted third party to provide a neutral platform for data. The Rapid Center will assist with threat detection because it is a centralized, neutral, secure, portal that is will provide reliable, current information.

Optical Scanning Technology for Marine Gate Systems

Early image processing system activities dealt with railroads by reading the numbers on the side of railcars. Images were acquired and 45 minutes later you could see the number most of the time. The early read rates at marine terminals were equally as good, about 32 percent. In 1993, there was a test in Los Angeles and they were never able to achieve more than 50 percent read rate. Of the 50 percent that they actually read, 50 percent was wrong. In Jacksonville a 90-day test in 1994 was able to achieve about 75 percent read rate. The final number was around 77 percent with a 10 percent error rate. That is still not acceptable. Today, there are significant improvements of the OCR technology.

At the UP Railroad facility in Kansas City, Missouri, over a two-year period of development, a read rate of 87 percent was achieved. Now, the average time to complete in-gate and out-gate processes is less than 90 seconds. Eliminating congestion at the gate is one of the advantages of the technology. But, the technology by itself doesn't solve the problem. The OCR is one piece of the overall solution, integrating it with the gate technology. You need to integrate all the necessary technologies, using expert systems with other technologies. Even if you are going to use manual input, you need to be verifying that it is a valid number, that is a usable number, and it is data that fits into your system process.

X-Ray Technology for Container Inspections

An advantage of the VACIS (vehicle and cargo inspection system) is its use of gamma rays. X-rays come from an x-ray tube electrically generated and gamma rays come from an isotopic source. The gamma ray source is a very small pellet, just a few millimeters in diameter, and it is a tungsten-lead shield and it projects a fan-shaped beam. The fan-shaped beam impinges on a linear array of very sensitive sodium iodine detectors. These detectors are only three inches thick, which makes them very efficient – it does not require a lot of gamma ray photons in order to make an image. In fact, unlike x-ray systems, this system can produce an image with approximately 100 times less radiation dose, which is very important because in many of the applications, there are people hidden in the containers – they are not supposed to be there, but sometimes people smuggle themselves or others inside containers. They should not be exposed to high levels of radiation. The dose given to a person inside a container is equivalent to being in an airplane at 30,000 feet for two minutes. The signals from the linear array of sodium iodine detectors are processed with a very simple PC-based workstation and the scanning is very fast. A 40-foot container can be scanned anywhere from 10 seconds to about one minute. Today, there are 30 VACIS systems that U.S. Customs Service bought and about 25 of them are currently operational mostly on the southwest border.

Freight Information Real-Time System for Transport

The concept of FIRST (Freight Information Real-Time System for Transport) is to take information about cargo movement and put it in one place to be accessed by the community that uses it. Next, the waterside information is integrated with the landside information to create a port information management system – a one-stop shopping site. FIRST is not a proprietary system. The Port Authority is leading the effort with money from federal sources and the Port Authority, to build the system. The system uses EDI message sets for the actual bill of lading, status changes, manifests, and that information is sent via flat file (FTP) over the internet. The system also incorporates the Port Authority sea link database of trucking companies and truck drivers. Every trucking company and truck driver has to have a sea link card and be registered in the sea link system to do business at the port. So, there is a great database of over 35,000 to 40,000 truck drivers that come through the port. FIRST is on the web at www.firstnynj.com. FIRST was

officially launched on September 5 and was not affected by the events of the 11th and as a matter of fact, FIRST did become a great source of information. The Port was able to post a lot of information about the port activities, Coast Guard activities, etc. on FIRST almost immediately and we have been continuing that. A registered carrier or a shipper or broker could actually go into FIRST and nominate a trucking company for a particular container. The nominated trucking company has the ability to actually go in and assign the driver through the sea link database. Then the carrier and the terminal can know who the driver is going to be for that particular load. All registered users have the ability to create watch lists where they would just enter a container that they are watching for status changes and the screen refreshes every 30 seconds and it constantly updates as the data is coming in.

SESSION 8 – ENVIRONMENTAL ISSUES

CHAIR
Jean Snider, National Ocean Service, NOAA

COORDINATOR
Richard Legatski, Legislative Affairs, NOAA

TITLE OF PRESENTATIONS AND SPEAKERS
"TRANSMAP: An Integrated Real-Time Environmental Monitoring and Forecasting System for Highways and Waterways in Rhode Island" by Malcolm Spalding, University of Rhode Island

"Hawaii Pilot Project to Build a National Early Warning System for Invasive Species" by Donna Turgeon, Michelle Harmon, and Gary Matlock; National Ocean Service, NOAA

"Key Environmental Issues in a Sound MTS Strategy" by Tom Chase, American Association of Ports Authorities and Tom Bigford, NMFS, NOAA

"Monitoring of Hydrodynamics, Sediment Transport, and Water Quality in the Port of New York / New Jersey: Preliminary Results" by Michael Bruno, Stevens Institute of Technology; Kelly Rankin, Stevens Institute of Technology; Frank McDonough, Nation's Port; and Robert Chant, Rutgers University

SUMMARY

TRANSMAP: An Integrated Real-Time Environmental Monitoring and Forecasting System for Highways and Waterways in Rhode Island

Malcolm Spalding provided a presentation on TRANSMAP (Transportation Mapping and Analysis Program), an integrated, real-time environmental monitoring and forecasting system for highways and waterways in Rhode Island. The resulting environmental data is critical for effective operation, management, and evaluation of various land and marine transportation systems. Selected data and model products will be available to the public and transportation user groups through the internet.

Hawaii Pilot Project to Build a National Early Warning System for Invasive Species

In her presentation, Donna Turgeon outlined the details behind the Hawaii Pilot Project to build a national early warning system for invasive species Once implemented, this project will provide managers and scientists with the ability to assess the risk of coastal exotic species becoming invasive, impacting native wildlife, and natural ecosystems, as well as economic and human health. In doing so, it has two main objectives: (1) identify the occurrence of exotic species as early as possible, and (2) quantify possible risks of exotic species. The complications for this project include a lack of consensus on hardware platforms, operating systems, network protocol, and data format. She stressed that, in order for this project to succeed, there must be a consensus on interoperability and an infrastructure to

support it. The system should prove extremely beneficial in providing automatic alerts for exotic/invasive species, GIS maps, ecological forecasts, and many other products.

Key Environmental Issues in a Sound MTS Strategy

Research and technology issues are very important to the environmental side of MTS. NOAA's ability to provide environmental services hinges on solid scientific information, but that essential basis for technical comments, consultation decisions, and environmental advice is often lacking. Business decisions based on incomplete knowledge pose economical, litigation, and ecological risks.

Key research needs include information on the life history and ecological needs of species occupying ports, harbors, and transportation corridors; specific information on migratory species whose occasional visits could offer solutions to scheduling challenges; and improved knowledge about animal behavior to predict the reaction of marine mammals, sea turtles, fish, and other species to underwater noise, turbidity barriers, hydrologic change, and other environmental alterations.

Key technology needs include careful consideration of the interplay between vessel designs, port configurations, and potential impacts to NOAA trust resources. In some ports, shallow-draft vessels could obviate the need for recurring maintenance dredging. Greater use of technology could narrow tolerances for dredging, thereby reducing the need to "over-dredge" for safety considerations. Technology can also help with environmental monitoring to track sediment plumes, water chemistry, and other basic factors that may improve confidence in our decisions.

Much of this relates to the on-going debate about the use of regulatory "windows" to dictate when dredging and other activities can occur or should be avoided. Improved information and full application of that information in an acceptable manner (risk averse, economically feasible, politically justifiable, etc) might offer more flexibility than the MTS community now enjoys when scheduling in-water projects.

As long as these types of R&T needs remain, efforts to streamline decision making will be frustrating. With sufficient information, more efficient permit review procedures and reasonable expectations can yield improved predictability to the MTS community.

Monitoring of Hydrodynamics, Sediment Transport, and Water Quality in the Port of New York / New Jersey: Preliminary Results

The annual maintenance dredging requirement in New York Harbor is almost four million cubic yards. Authorized deepening projects, some of which are now underway, will raise the requirement for disposal of dredged material to more than 150 million cubic yards over the life of the projects. However, it is no secret that the silty material, which makes up much of the harbor's bottom, is encumbered by a complex mix of contaminants resulting from historic and current pollution sources. This contamination drastically limits disposal options for dredging projects. To meet the challenge of

managing this material, the region, and particularly the State of New Jersey, has adopted a tripartite approach to dredged material management. First the State of New Jersey declared that beneficial use of dredged materials shall be the preferred disposal option; and has developed a number of uses for these materials such as brownfields remediation. Second, the state along with the federal agencies, funded and oversaw the development of a number of innovative technologies for decontamination, processing, and use of dredged material, and for the reduction in siltation. Finally the state, along with the State of New York, embarked on a toxics trackdown program designed to identify and eliminate the sources of contamination. This latter program, for which more than $30 million has been dedicated by the two states, is operated in conjunction with the Harbor Estuary Program for New York Harbor (HEP) and is a major component of the HEP Contaminant Assessment and Reduction Program (CARP). Tom Bigford's presentation focused primarily on CARP.

In New Jersey, hydrodynamic and water and suspended sediment quality studies are underway in Newark Bay, the Arthur Kill, and Kill van Kull. This work is coordinated with water and sediment quality sampling studies undertaken at the head-of-tide and within the tidal reaches of the major New Jersey tributaries that discharge into the NY-NJ Harbor. The goal of these synoptic studies is to develop an understanding on the contaminant transport pathways within this region of the estuary. The program uses a combination of three (3) fixed mooring stations, shipboard measurements at specified locations, and shipboard transects throughout the area. Measurements include current profiles using a towed Acoustic Doppler Current Profiler; conductivity-temperature-depth measurements using a CTD system; measurements of turbidity using an Optical Backscatter Sensor; measurements of suspended sediment concentration and particle size spectrum using a laser-based scatterometer; and water and suspended water quality measurements using Trace Organic Platform Samplers (TOPS) and grab sampling devices. Preliminary analysis of the data collected over the past year indicates that the Newark Bay/Kills system is influenced by several types of forcings, including tide, wind, and freshwater inflow. These highly variable forcings are responsible for dramatic variations in hydrodynamic and sediment transport characteristics, including for example, the connectivity of the system with the Hudson River. These transport characteristics play a significant role in determining the fate of sediment and water-borne contaminants in the Harbor. The presentation described the measurement program and data analysis, and offered preliminary conclusions regarding the dominant transport processes – and links to contaminant transport – within the Newark Bay/Kills system.

SESSION 9 – REGIONAL SEDIMENT MANAGEMENT II

CHAIR
Barry W. Holliday, U.S. Army Corps of Engineers

COORDINATOR
William McAnally, U.S. Army Corps of Engineers

TITLE OF PRESENTATIONS AND SPEAKERS
"Understanding Geologic Framework and Processes of Coastal Sedimentation Systems" by Jeff Haines, U.S. Geological Survey

"Candidate Eutrophication Models for TMDL Analyses in Support of the Clean Water Act" by Robert Carousel, Environmental Protection Agency

"Atchafalaya River and Mississippi River Gulf Outlet – Navigation Issues" by Tonja Koob, U.S. Army Corps of Engineers

"Maintaining Reliable Navigation Channels While Altering Alluvial Processes" by John Remus, U.S. Army Corps of Engineers

SUMMARY
Many water resource projects are designed and operated to remedy local sediment problems, sometimes at the expense of creating even larger problems some distance away. Successful project design and operation requires that sediment issues be resolved at both local and regional levels, yet resource managers lack the information and tools needed to make informed decisions. These challenges adversely affect navigation, flood and storm damage reduction efforts, and environmental quality in water resource projects. The U.S. MTS Task Force provided a national vision for MTS 2020, recommending R&D on overall effective sediment management which includes "holistic watershed and local/regional planning efforts." To meet this vision, a Regional Sediment Management Program is currently being developed to (a) provide knowledge and tools needed for holistic regional sediment management within USACE water resource projects to achieve economic and environmental sustainability, and (b) enable project planning, design, construction, operation, and maintenance that will minimize disruption of natural sediment pathways, or mediate natural processes that have adverse environmental or economic impacts.

Topics presented at this session included technical innovations and tools for better sediment management, and case histories of success stories in beneficial use. Speakers represented a diverse set of interests and organizations, including USACE and other federal agencies. The topics regarding the research and development and application of new technologies represent multi-agency efforts.

<u>Understanding Geologic Framework and Processes of Coastal Sedimentation Systems</u>
John Haines presented examples from USGS geologic mapping and research programs to provide a regional understanding of sediment distribution, transport, and evolution of coastal and nearshore systems. Results from both the Pacific and Atlantic coasts contribute to our understanding of the linkages between inner shelf, nearshore/coastal,

and river mouth deposits. He discussed developments in process understanding and modeling capabilities, as well as the implications of regional sedimentary systems on a variety of issues including shoreline erosion and habitat maintenance.

Candidate Eutrophication Models for TMDL Analyses in Support of the Clean Water Act

The Clean Water Act §303(d) requires the development of Total Maximum Daily Loads (TMDLs). The provisions provided in this act require each State to produce and provide the U.S. Environmental Protection Agency with a list of waters where water quality standards are not being attained, to prioritize the development of TMDLs for the water bodies that will result in attainment of standards, and to develop and implement the TMDLs. A TMDL is an estimate of the maximum pollutant loading from point and nonpoint sources that receiving waters can accept without exceeding water quality standards. A primary environmental focus for TMDLs is the use of models for characterization of sources of nutrients and sediments and their relative loadings from the river basins, and the role of nutrients/sediments from sub-basins on water quality in rivers, lakes, and estuaries for impacts such things as excessive algal blooms, low dissolved oxygen, and related fish kills. Nutrient TMDLs that warrant a detailed characterization and assessment of receiving water bodies in many instances require the use of an eutrophication model. A methodology is presented by which seven water quality models were identified as candidates for use in developing TMDLs for nutrients and sediment.

A case study was conducted to identify/evaluate receiving water quality models that provide a means to evaluate nutrient (i.e., nitrogen, phosphorus, or carbon) cycling by considering water-quality based variables and processes for Total Maximum Daily Load assessments. A large (80) number of water quality models were evaluated by searching and documenting the sources of information for science, criteria for model documentation, usage and technical support, software architecture, and nutrient (i.e., nitrogen, phosphorus, carbon) cycling. Based on a screening process developed in previous work, seven models satisfied the minimum requirements imposed by the pre-screening. This research presents the results of the first of two detailed model evaluations in the form of comparison matrices and explanatory text of the seven water quality models selected for use in TMDL assessments and potential linkage to watershed overland flow and transport models. Comparisons are made to hydrodynamic, sediment, water quality constituent capabilities, auxiliary model application tools and comparisons of usage, application and support. Model comparisons for each element used a two-tiered approach. First, *all* models have been compared head-to-head using general criteria. Afterwards more subtle differences between *similar* models (e.g., 3-D models) have been identified and documented using more specific criteria.

Future plans include a detailed model evaluation of eutrophication capabilities by comparing their differences from four systems including plants (phytoplankton,

periphyton, and macrophytes), the nitrogen cycle, the phosphorus cycle, the carbon cycle and dissolved oxygen balance.

Atchafalaya River and Mississippi River Gulf Outlet – Navigation Issues

The Mississippi River and two of its distributaries, the Atchafalaya River and the Mississippi River Gulf Outlet, are all major navigation channels through estuarine environments maintained by the New Orleans District of the Corps of Engineers. Each channel experiences riverine, estuarine, and coastal processes as it empties into the Gulf of Mexico. Despite their similarities, each channel has different sediment issues that directly impact navigational activities. At one extreme, the Atchafalaya River navigation channel courses through an actively building delta requiring frequent maintenance and advance maintenance dredging to keep it open to project depth. At the opposite extreme, the Mississippi River Gulf Outlet is experiencing tremendous wetland loss and habitat destruction primarily from the ship traffic traveling through that channel. The Mississippi River, geographically located between its two distributaries, experiences both land creation and land loss, depending on the time of year and local weather patterns. Because of the complex nature of sediment management along coastal Louisiana, new and innovative research approaches are needed for effective operation and maintenance of these estuarine navigation channels. Tonja Koob's presentation provided an overview of the navigation issues and addressed those gaps in current research and technology.

Maintaining Reliable Navigation Channels While Altering Alluvial Processes

The Missouri River from Sioux City, Iowa to the mouth, a distance of 734 miles, has been narrowed and straightened by the Corps of Engineers. The banks have been fixed in-place through a series of revetment and transverse dikes. Discharges upstream of Sioux City are controlled through a series of dams. Two of the results of this development have been the elimination of the natural depth diversity and the loss of the upstream sediment supply that has contributed toward incision at several locations along the Missouri River. The loss of depth diversity has benefited navigation, but has lead to the listing of a number a species as threatened or endangered. The channel incision negatively impacts the environment, but also hinders navigation as loading facilities become farther from the waters edge. John Remus's presentation provided an overview of the concepts implemented and/or proposed to date an assessment of the relative risk associated with each concept, and a listing of technology gaps.

SESSION 10 - FERRIES

CHAIR
Richard Lolich, Maritime Administration

COORDINATOR
Michael Gordon, Maritime Administration

TITLE OF PRESENTATIONS AND SPEAKERS
"Vessel Wake and Other Issues Facing Ferry Operators" by James Bamberger, Maritime Institute of Technology

"Challenge and Opportunities in Financing Ferry Boats and Operations" by Clayton Cook, Management and Transportation Associates

"Ferry Vessel Design Which Creates Little or No Wake" by Bill Burns, Mangia Onda Company

"Pre and Post September 11th Impact/Importance of Ferry Transportation in the New York Area and Technological Needs from the Customer's View" by Roberta Weisbrod, Partnership for Sustainable Ports

SUMMARY
The Role of Ferry Transportation.
There are about 225 ferry operators in the U.S., serving 487 routes with 677 vessels. Each year more than 113 million passengers and 32 million vehicles are carried by these ferries. In fact, ferries carry more than four times as many passengers annually than AMTRAK. It is interesting to note that ferries serve 43 states and territories of the U.S. These ferry operators serve a variety of markets. Some are major components of the metropolitan transportation systems in places like Boston, New York, San Francisco and Seattle. Some provide essential links to the many islands along the East and West Coasts as well as on the Great Lakes or the Gulf Coast. Others provide vital links on low volume roads in rural areas that cannot justify the expense of a new bridge or tunnel based on their traffic volumes.

Four of the most congested metropolitan areas in the country have extensive ferry operations that could be expanded. Tourism is one of the fastest growing industries in the U.S. and a significant number of sites served by ferries are places that people like to visit. A good example is the 55 routes that serve various elements of our National Park system.

Ferries have also provided a vital role during natural disasters. When the Loma Prieta earthquake struck San Francisco and shut down the Oakland Bay Bridge, ferries provided a critical service linking East Bay communities to San Francisco. North Carolina also relies on ferries to evacuate residents on coastal islands during the hurricane alerts. Everyone is also familiar with the massive evacuation role which the New York area ferries played on September 11, 2001 and afterward. Without these ferry services, there may well have been many more injuries and lives lost.

The Problem of Congestion.
As the traditional surface transportation modes (rail and highway) become increasingly congested, they will be challenged in meeting the transportation needs of a growing U.S. economy or of sustaining the international trade vital to that growth. Left unchecked, increasing

congestion on our highway and rail networks will lead to spreading gridlock and ultimately to economic stagnation (if not meltdown). Symptoms of these problems are with us today, from accidents that tie up local interstates for hours, to major events such as occurred in the Houston area following the UP-SP merger.

Both intercity and metropolitan ferry operations can help alleviate this congestion. There are several major transportation/population corridors which also have parallel water routes that could be exploited or expanded to accommodate some of that additional congestion. Among them are the San Francisco Bay, Buffalo-Cleveland, Cleveland - Detroit, Buffalo - Rochester, Chicago - Milwaukee, Southern Connecticut - New York City, and Mobile, Alabama - New Orleans - Houston. These routes are not being used at capacity and could provide an overall low cost transportation alternative to the congested roads and rails in those areas.

Many of our existing ferry terminals are located within our largest and busiest ports, where ferries compete with large containerships and bulk carriers for waterway access. In those ports where must be closer coordination between the cargo and passenger carriers as well as the port authorities to ensure that the passenger segment (ferries) employs adequate security measures throughout there operations. At the smaller terminals, where there may not be a port authority or other public agency, appropriate security measures need to be developed to assist the operators.

Some of the critical security ferry issues that need to be addressed are:

- How to adequately screen the more than 113 million passengers carried on ferries each year
- How to properly inspect the more than 32 million vehicles carried on ferries each year - vehicles carrying a wide variety of fuel types
- How to coordinate security measures with the ferry operators and the local port authorities

Potential Barriers

There are a number of issues that could impede new or expanded ferry services. Among them is the difficulty encountered in trying to build new terminals. Local opposition to new terminal sites usually focuses on the traffic impact associated with passengers arriving at the terminal by car. Another problem in siting terminals is that the availability of new sites for terminals is becoming increasingly limited as the waterfronts are redeveloped and the cost of those sites that are available is rapidly rising.

One of the biggest issues is funding. Ferries are supported by both public and private funds. Of the approximately 225 operators, only about 89 receive public funds from either the federal, state or local governments or from a combination of the three. Although there are more federal funds available now than prior to TEA-21, operators cite a number of difficulties in accessing these funds. Projects must first be on an approved state or metropolitan plan and program. Aside from the Ferryboat

Discretionary Program, ferry projects must compete with other transportation needs for available funds. Some operators are not familiar with these ongoing planning processes and as a result they are unlikely to be as successful as other players.

Ferry transportation is a vital component of our Marine Transportation System, and must be integrated into the Nation's overall transportation planning process. Faster vessels and propulsion systems which produce lower air emissions must be built. Secretary of Transportation Norman Mineta recently stated that "Ferries reduce passenger and freight congestion." We must ensure that they continue to play that very important role in our Nation's transportation system.

SESSION 11 – CONTAINER ON BARGE: PROBLEMS, PRACTICAL AND POLITICAL

CHAIR
Bill Ellis, Port Authority of New York and New Jersey

COORDINATOR
Jim McCarville, Port of Pittsburgh

TITLE OF PRESENTATIONS AND SPEAKERS
"Stream-of-Commerce Container Study" by Robert Holliday, U.S. Customs Service

"Calculating the Public Air Quality Benefits of Private Container on Barge Movements" by James Corbett, University of Delaware

"How One State Looks at Air Quality and Maritime/Container on Barge Issues" by Bill Jordan, Texas National Resource Conservation Commission

"Operational Issues Initiating a Container on Barge Service" by William Edwing, Osprey Lines

"Discussion: Devising a Research Strategy for Container on Barge" by Jim McCarville, Port of Pittsburgh

SUMMARY

Stream-of-Commerce Container Study

To accommodate a scheduling complication, the panel opened with an interesting presentation by Robert Holliday, U.S. Customs Officer, regarding the tracking of containers between the U.S. and Canada. This technology will also be very useful for containers moving in the coastwise and inland river trade.

Calculating the Public Air Quality Benefits of Private Container on Barge Movements

As a researcher and professor at the University of Delaware, James Corbett presented research indicating that savings in air emissions could be accomplished under certain container on barge services, but not necessarily all. He laid out a methodology to examine the relative advantages, as well as the advantages of certain clean burning new engines.

How One State Looks at Air Quality and Maritime/Container on Barge Issues

William Jordan presented the perspective of the regulatory battles in south Texas that looked at Container on Barge as a solution to the movement of cargo. He reviewed the pros and cons that were present in the debate as well as how Texas looked at solutions to those issues.

Operational Issues Initiating a Container on Barge Service

As an operator engaged in the Container on Barge business in the Gulf Intracoastal Waterway, William Ewing presented the operational considerations and advantages that led to the successful business operations of Osprey Lines, Inc. in moving containerized cargo on barges in and out of the Houston hub. His statistics surprisingly could beat road and rail traffic in certain markets.

Discussion: Devising a Research Strategy for Container on Barge

James McCarville presented the efforts of the Port of Pittsburgh to help organize container on barge markets, including the SmartBarge.com marketing tool to

electronically link potential shippers and carriers.

SESSION 12 – NAVIGATION AND INFORMATION SYSTEMS II

CHAIR
Andrew Silver, Naval Surface Warfare Center, Carderock Division, United States Navy

COORDINATOR
Siraj Khan, U.S. Customs Service, Department of Treasury

TITLE OF PRESENTATIONS AND SPEAKERS
"Ship Performance Measurements—Houston Ship Channel, Galveston Bay, Texas" by Larry L. Daggett, Waterway Simulation Technology, Inc.

"Entrance Channel Design Tool" by Andrew Silver, U.S. Navy and Zeki Demirbilek, U.S. Army Corps of Engineers

"Next Generation of Navigation Aids Research (NGEN NAV)" by Walter Heerlein, Rich Hansen, and Ric Walker; U.S. Coast Guard Research and Development Center

"Integrated Marine Communications – A Tool to Improve Vessel Management" by James Tindall, MariTEL and Ronald Gaynor, Harris Corporation

"Automated Commercial Environment (ACE): Business and Technology Benefits" by Charles Armstrong, U.S. Customs Service

SUMMARY
This was the second of two technical sessions dedicated to Maritime Navigation and Information Systems. The five papers presented at this technical session focused on the dynamics of deep draft ships in shallow and narrow entrance channels, improvements to the Coast Guard's navigation aids, ship to shore communications, and new devices and procedures to aid the Customs service track cargo.

Ship Performance Measurements—Houston Ship Channel, Galveston Bay Texas

There were two papers that investigated the motions of ships in narrow and shallow channels. The first paper by Waterway Simulation Technology Inc. looked at vertical and horizontal ship motions in the Houston Ship Channel, and documented the relevant environmental and ship control factors that influence the ship motions. The ships chosen for this study were tankers, container ships. Ship position and motion measurements were obtained by Differential Global Positioning Satellite (DGPS) receivers. The ships were instrumented with potentiometers and cameras to record the engine RPM and rudder position to collect data on maneuvering and controllability. Water level data were obtained from NOAA's PORTS system and the water current data were obtained by an Acoustic Doppler Current Profile (ADCP). Vertical and horizontal ship motion data were collected for twenty-five ships that made transits of the channel. The next step will be to further process and analyze the data.

Entrance Channel Design Tool

The other paper on ship dynamics was presented by the Naval Surface Warfare Center, Carderock Division (NSWCCD) described collaborative work NSWCCD was undertaking with the U.S. Army Corps of Engineers to provide a channel

design tool based on underkeel clearance. NSWCCD has developed an operational entrance channel guidance system, the Environmental Monitoring and Operator Guidance System (EMOGS), that predicts the underkeel clearance of a deep draft ship in shallow entrance channels based on real-time environmental data of waves and water level. This system has been operating for 13 years at two locations. The purpose of this project is to convert EMOGS into a channel design tool based on underkeel clearance. Work is just beginning on this project. Once the channel design tool is completed, the U.S. Army Corps of Engineers will use field data collected with ships will be used to compare, calibrate the design tool and validate the assumptions associated with the tool.

Next Generation of Navigation Aids Research (NGEN NAV)

The Coast Guard Research and Development Center presented their ongoing research in the area of aids to navigation. The Coast Guard's interpretation of the next generation navigation systems were presented and compared to today's products. The main drivers for developing new products is cost savings, increased information for the maritime community, and increased safety. Many of the new aids to navigation will be taking advantage of augmented reality. This is the expanded knowledge of ones environment with useful layers of information. The plan is to develop a technology roadmap for next generation navigation aids, fill in the research and development gaps, and partner with industry and stakeholders to achieve this paradigm shift.

Integrated Marine Communications – A Tool to Improve Vessel Management

Next MariTEL and Harris Corporations presented their Integrated Marine Communications System. They described the conception, design, construction and implementation of the integrated voice, data and vessel tracking communications network. This network supports automatic voice and data calling from ship-to-shore, shore-to-ship, and ship-to-shore-to-ship. The network's security for this communication resides in a Network scrambling protocol that makes the conversations and data communications private. Department of Defense encryption can also be handled on the network. The current status is that real-time positioning information and ship-to-shore-to-ship calling is available in the Gulf of Mexico and up the Mississippi River to Memphis, Tennessee. Eventually, this system will be operational nationwide.

Automated Commercial Environment (ACE): Business and Technology Benefits

The U.S. Customs Service of the Department of Treasury described their modernization objectives to replace the Automated Commercial System with a new Automated Commercial Environment (ACE). The new program system will track imports and process them more efficiently by automating transactions, provide national views of importer activity for compliance purposes and increase flexibility. The new ACE will enhance national security by using relational databases to track cargo, ships, trucks, planes, and crews before port arrival. This will provide a national perspective for enforcement violations, and provide support for

sharing information among other government agencies nationwide. ACE will also be using the Internet, wireless communications and Artificial Intelligence to process information. The system is being developed in four stages and two release versions.

V. POSTER SESSION

PAPERS

"Oceanographic Model Forecast Systems: Economic Benefits for the Marine Transportation System" by Bruce Parker, National Ocean Service, NOAA

"Navigational Aids User Survey" by Ric Walker and Kathleen Shea, United States Coast Guard Research and Development Center

"Houston Ship Channel Hydrodynamics: Measurement and Modeling Perspective" by Richard Schmalz, National Ocean Service, NOAA

"Application of Multi-beam Echosounder Systems to Habitat Delineation" by Bob Pawlowski and Jerry Wilson, Thales GeoSolutions

SUMMARY

A poster session ran for the entire length of the Conference in the main hall of the National Academy of Sciences building. It consisted of four technical papers, all of which were related to Navigation and Information Systems, although the fourth paper dealt with the application of data usually obtained for navigation information systems to ecosystems, and so is related to the technical session on Environmental Issues.

Oceanographic Model Forecast Systems: Economic Benefits for the Marine Transportation System

In the last decade real-time oceanographic data systems, which provide real-time water levels (for determining underkeel clearances for commercial shipping) and current fields (for improved ship maneuvering), have become common in the world's ports because of their importance to safe navigation and the prevention of accidents. Bruce Parker described in this paper how these systems when combined with a forecast capability can also make an important contribution to maritime efficiency and port throughput, while also helping to protect the marine environment as an important side benefit. Sophisticated oceanographic model systems, driven by weather forecast models and river inputs, can provide 24-hour or longer forecasts of water levels and 3-dimensional current and density fields, which can be used to determine optimum loads for ships leaving port and optimum arrival times for ships arriving in port. The detailed current fields produced by the model systems can also be used to better predict the trajectory of hazardous spills leading to more efficient clean up. The Coast Survey Development Laboratory in the National Ocean Service, NOAA, presently has forecast model systems operating in Chesapeake Bay, the Port of New York and New Jersey, and Galveston Bay, with others being developed.

Navigational Aids User Survey

In this paper Ric Walker and Kathleen Shea described the Aids to Navigation (AtoN) User Survey, which was developed to gather information on user preferences for navigational aids as electronic navigation becomes more prevalent. The intention is to develop new information, methods, and tools to support the AtoN program manager in determining future AtoN System requirements and related program

policies and strategies. This was in response to the Coast Guard's need to take a fresh look at the entire aid system mix (aids to navigation and navigational aids) and determine the types of visual, auditory and electronic systems that are necessary today and in the future to enhance mobility and safety on the waterways, while reducing the cost of the aids to navigation program. An interactive, web-based survey instrument was developed, and a pilot survey of mariners was conducted in the Tampa Bay area during FY2000. Over 3000 individuals were contacted resulting in nearly 700 survey responses. The survey responses have been analyzed, and a final report is available. The results provide a better understanding of current user preferences at a point when navigational technology, which relies heavily on short-range (visual) aids to navigation, is evolving to a future state in which electronic navigation systems predominate. This effort will be linked to research on the Next Generation NavAids and Intelligent Waterway Systems. A broad application of the survey would provide the Coast Guard's AtoN Program manager with better information on which to base decisions regarding future AtoN systems and policies. This should ensure that user requirements are met, navigational safety and mobility are enhanced, and opportunities to adjust the mix of systems for potential cost savings are fully evaluated.

Houston Ship Channel Hydrodynamics: Measurement and Modeling Perspective

Richard Schmalz described a project that focuses on the measurement and modeling of the vertical density and current structures and water surface elevation slopes along the Houston Ship Channel in support of safe navigation. A nowcast/forecast model system for Galveston Bay, with a fine-resolution Houston Ship Channel model embedded in it, was developed to supplement the Physical Oceanographic Real Time System (PORTS) installed in the Bay by the NOAA's National Ocean Service (NOS). This system has been used to provide a daily 36-hour forecast, initiated from a nowcast based on the previous 24 hours of real-time data and using both bay and channel models in a pseudo-operational setting since April 1999. To seek improvements in the prediction of the current and density structure, a joint NOS-Sea Grant sponsored current and salinity/density survey of the Houston Ship Channel was conducted in September 1999. Results from the towed ADCP/CTD survey were analyzed and compared with the nowcast/forecast model system results. Based on the comparisons the following additional modeling and measurement tasks have been identified: 1) improve model vertical coordinate, 2) improve model grid generation for navigation channels, and 3) improve current, salinity and temperature measurement strategy in conjunction with potential PORTS expansion activities. The improved forecasts of water levels, currents, and density are expected to improve the efficiency of navigation to and from the ports of Houston and Galveston.

Application of Multi-beam Echosounder Systems to Habitat Delineation

In this paper Bob Pawlowski and Jerry Wilson described how multi-beam echosounder (MBES) systems are enabling detailed bathymetric surveys of coastal and offshore features. Through a combined approach utilizing the MBES

and psuedo-sidescan backscatter data, a detailed interpretation of the seabed can also be made. The results of these interpretations can provide the basis for addressing environmental questions with waterway improvement and waterway management. Examples of MBES surveys from coastal California and Alaska were described in the paper, including surveys off Morro Bay, California, in the Gulf of Alaska, and in Glacier Bay National Park. Data collected are being processed for enhanced digital terrain models (DTMs) and mosaics, allowing interpretation of bottom types and geologic features. Additional surveys are being planned in support of Marine Protected Areas, Essential Fish Habitat, and to document specific coastal development concerns. Evolving processing procedures are enabling more refined analysis of psuedo-sidescan data and the backscatter component. The enhanced DTMs and mosaics will provide benefit to waterway planners and managers in determining the appropriate approach to waterway development while sustaining habitats and resources associated.